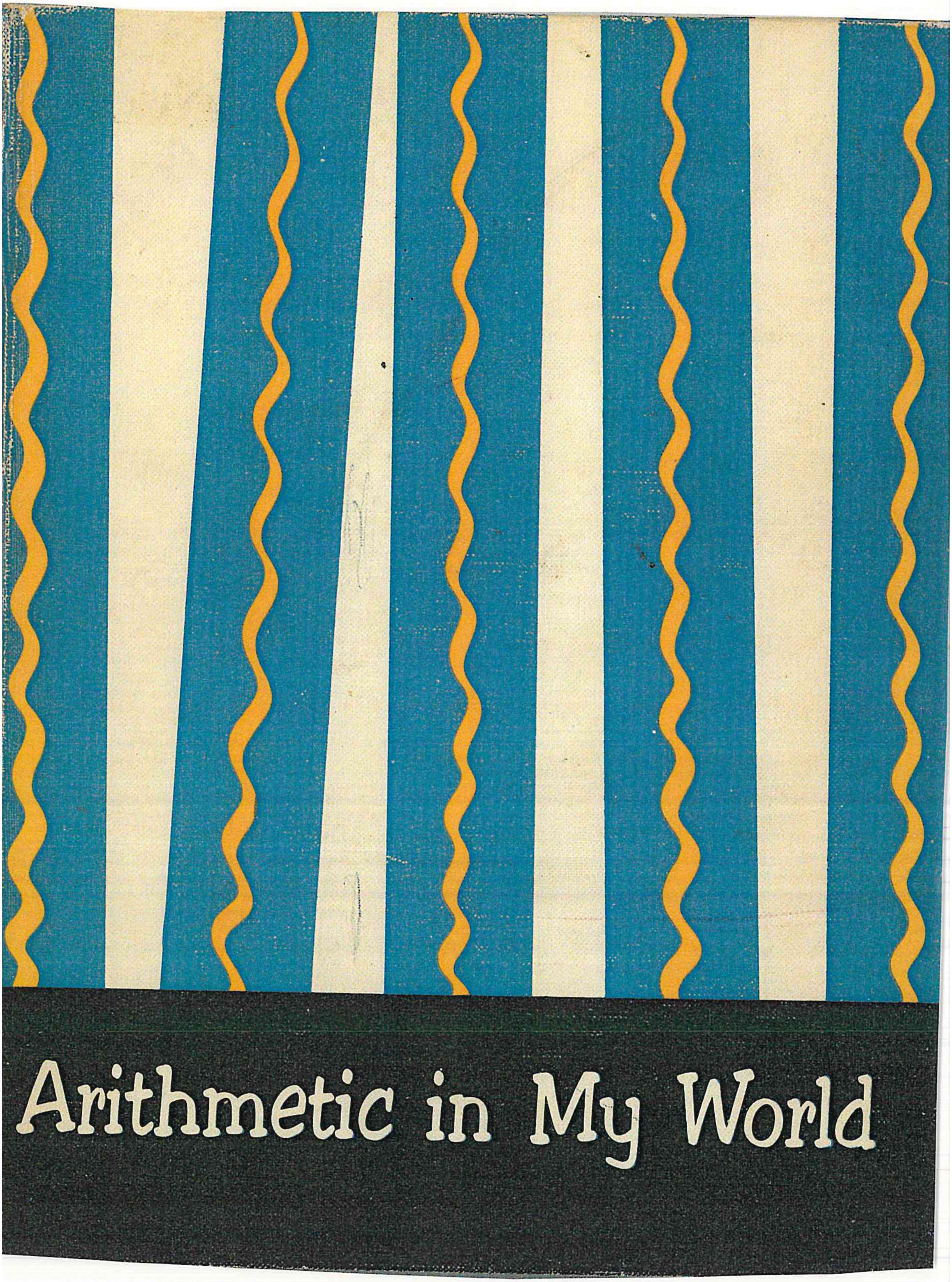

Arithmetic in My World

Arithmetic

IN MY WORLD

by

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4

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ARITHMETIC IN MY WORLD

4

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The authors believe that the learning and teaching of arithmetic is based on child growth. Through the study of many thousands of children and their problems, they have determined how and what children should learn in order to establish desirable growth patterns. They have found that children's problems can be organized into units of work composed of activities which are in reality areas of development.

It should be noted that there are two headings for each unit in the Contents. The first heading names the social situation which the authors have established for each unit of work. The second heading indicates the associated arithmetical concepts which are developed in the unit.

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Contents

Unit Page

1 We Need Arithmetic Right Now . 4
Addition and Subtraction to Number 39

2 We Go Places and Do Things . . . 40
Multiplication and Division to Number 39

3 Doing Things for Ourselves 78
Multiplication and Division to Number 81

4 Work and Play on the Farm . . . 106
Addition of Whole Numbers

5 Foods for Your Table 138
Subtraction of Whole Numbers

6 Our Pets 170
Multiplication of Whole Numbers

7 Having Fun and Doing Things in Groups 206
Division of Whole Numbers

8 We Help Others 240
Fractions — Meanings and Processes

9 Measurements in Your Work and Play 270
Length, Capacity, Time, Temperature

10 Getting Ready for Summer . . . 298
Using Larger Numbers

UNIT 1

We Need Arithmetic Right Now

When Jack went with his father by airplane to New York, they flew over the country side. Jack saw farm crops growing, farmers working in the fields, cows and horses grazing in the pastures, and small animals in the barnyards.

They flew over towns and cities, too. Jack saw cars and busses instead of farm animals; green lawns and parks instead of pastures; stores, schools, churches, and long streets of city homes instead of barns and farm houses. Instead of field workers, Jack saw many people walking along the sidewalks.

Study the pictures on the opposite page and think about the ways numbers are used in the city.

1. In what ways are numbers helpful when you shop in a clothing, department, or shoe store?

2. Do you need to know numbers at a railway station, a bus depot, or an airport? in what ways?

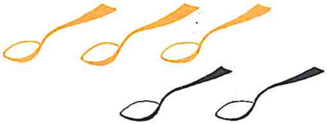
3. How do people use numbers when they buy gas and oil at a gas station?

If Jack could have looked down into one of these houses he might have seen a little girl helping her mother. When you are cooking or setting the table, do you need numbers? in what ways?

Addition and Subtraction — Facts and Processes to Number 39

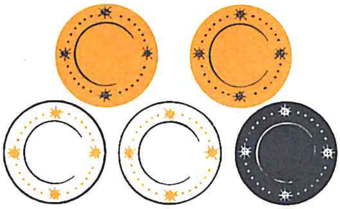
Helping Mother and Father

There are five in the Ball family. Barbara and Jim are setting the table for their mother:



3 spoons
+ 2 spoons
? spoons

4 knives
+ 1 knife
? knives



2 plates
+ 3 plates
? plates

4 bowls
+ 3 bowls
? bowls

Aunt Mary and Uncle Bill are coming for dinner tonight. Barbara and Jim are setting the table for seven:

5 knives
+ 2 knives
? knives

3 forks
+ 4 forks
? forks

2 cups
+ 2 cups
? cups

5 spoons
+ 4 spoons
? spoons

6 glasses
+ 1 glass
? glasses

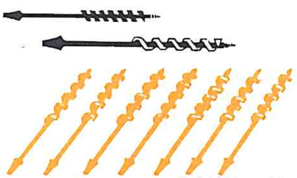
5 bowls
+ 3 bowls
? bowls

1. Barbara and Jim like to help their father in his work.

a. Father had 3 nails. Barbara handed him 6 more. How many does he have now?

3 nails
+ 6 nails
? nails

b. Jim is helping his father put the bits away. There are 2 bits in the case. Jim put in 7 more. How many bits will there be in all?



2 bits
+ 7 bits
? bits

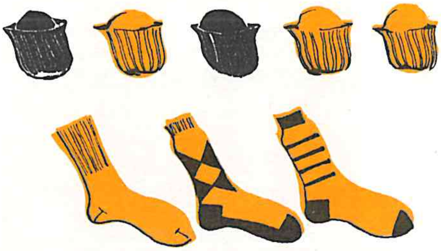
Addition Facts — 1 to 10

A Tale of Twins

Jim and Barbara, the Ball twins, are glad school is beginning again. They will be glad to have work to do and to see all of their friends again.

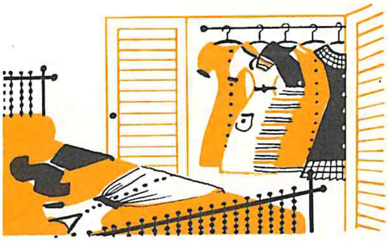
Jim and Barbara are helping their mother get their clothes ready for school. They are putting their clothes away carefully.

1. Jim has been rolling each pair of socks to keep them in pairs. How many pairs does he have?



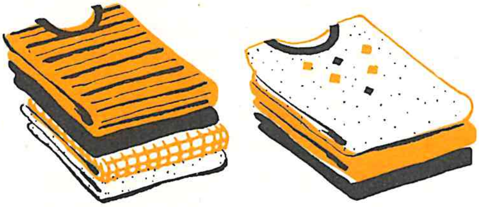
5
+ 3
8

2. Barbara is hanging her new dresses in the closet. How many dresses does she have in all?



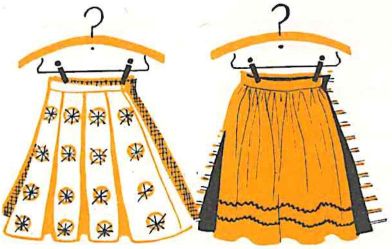
2
+ 5
7

3. Jim is going to put his T-shirts in his drawer. How many does he have?



4
+ 3
7

4. Barbara's mother made some new cotton skirts for her. How many did she put on each hanger?



2
+ 3
5

5. Add:

a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
5	8	4	2	6	3	7	4	2	6
5	2	2	7	1	4	1	4	3	3
10	10	6	9	7	7	8	8	5	9

Addition Facts — 1 to 10

Barbara and Jim Learn More about Adding

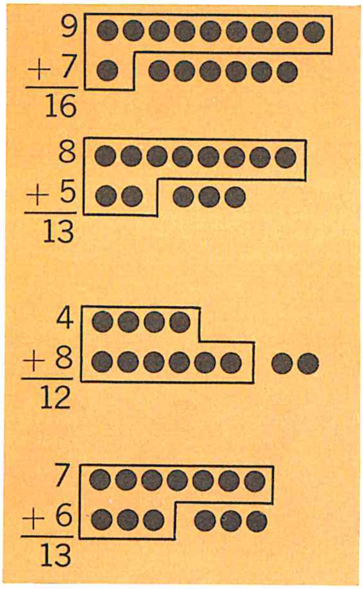
Barbara and Jim went window shopping. They got many ideas about what to buy for school clothes and supplies. That night they decided they needed some practice in addition before they went back to school.

Jim didn't know how many 9 and 7 were, so he said, "9 and 1 are 10. Then 10 and 6 are 16."

It was Barbara's turn to do a problem, 8 and 5 = ?. She said, "I am going to use 5 as 2 and 3. Then, 8 and 2 are 10, and 10 and 3 are 13."

If we have the number 4 and want to add 8 more to it, we know that we need 6 more than 4 to get 10. So, we separate the 8 things into 6 things and 2 things.

Jim thinks that adding 7 and 6 is hard unless he separates the 6 into 3 and 3. Then he can think, 7 and 3 are 10; 10 and 3 are 13. So, 7 and 6 = 13.

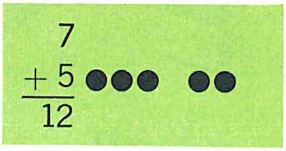


Let's go to work:

1. Use counters to see how many different groups you can make from 7 things. Do you have all of these?

● ●●●●●●   ●●●● ●●●   ●● ●●●●●

2. Write these exercises on paper. Draw circles beside the second numbers to show how you made parts out of these numbers to help you find the addition facts:



9	6	8	7	9	8	6	8
7	8	4	6	6	7	5	5

Practice in Adding

8
+7 ●● ●●●●●
15

8 + 2 = 10; we use the 7 as 2 and 5. It helps us to find a 10. Then, 10 + 5 = 15.

1. Draw circles or x's to show how you may use parts to help you find a 10 in each of these:

a.	b.	c.	d.	e.	f.	g.	h.	i.
8	9	6	3	7	5	4	8	7
8	8	8	8	8	8	8	2	6
16	17	14	11	15	13	12	10	13

2. Add by using counters to build a ten and some more:

8	6	5	9	7	3	4	8	7
9	9	9	9	9	9	9	6	6
17	15	14	18	16	12	13	14	13
5	6	7	9	5	6	8	6	7
9	9	7	8	3	5	5	6	5
14	15	14	17	8	11	13	12	12

3. Show how you used parts of a number to help you add these:

6
9 9 = 4 and ?

9
7 7 = 1 and ?

9
9 9 = 1 and ?

8
7 7 = ? and 5

8
4 4 = 2 and ?

6
8 8 = ? and 4

7
6 6 = 3 and ?

6
5 5 = ? and 1

8
5 5 = ? and ?

4. Add:

7	9	6	5	8	4	9	6	8
6	8	8	6	7	7	9	5	8
13	17	14	11	15	11	18	11	16

Give and Take

Jim and Barbara have fun trading things. They make a game out of it. They call it "Give and Take." They know that "take away" means subtraction.

1. Barbara put down 7 trading cards. She said Jim could have 4 of them if he gave her some of his stones. If she gave him 4 cards, how many did she have left?

$$\begin{array}{r} 7 \\ -\,4 \\ \hline \end{array}$$

2. Jim put down 8 stones. He said Barbara could have 6 of them. How many stones did he have left?

$$\begin{array}{r} 8 \\ -\,6 \\ \hline \end{array}$$

3. It is Barbara's turn. She has 9 pennies. She says Jim can take 4 of them if she can have 2 of his note pads. How many pennies does Barbara have left?

$$\begin{array}{r} 9 \\ -\,4 \\ \hline \end{array}$$

4. Do you know these subtraction facts? Cover the answers with a sheet of paper. Then write your answers and check them with the answers below:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**	**j.**	**k.**	**l.**
9	8	7	9	8	7	9	8	6	8	9	7
1	2	4	3	7	5	8	3	4	6	7	6
8	6	3	6	1	2	1	5	2	2	2	1

6	9	7	5	6	9	7	8	9	8	7	6
5	6	2	3	2	2	3	1	5	5	1	1
1	3	5	2	4	7	4	7	4	3	6	5

Subtraction Facts in Numbers through 9

Jim and Barbara Trade More Things

1. Jim put 10 bird pictures on the table. He said Barbara could have 7 of them. Find how many he had left.

$$\begin{array}{r} 10 \\ -\ 7 \\ \hline \end{array}$$

2. Jim said Barbara could have 8 of his stamps for some of her paper money. Take away 8 stamps and tell how many Jim would have left.

$$\begin{array}{r} 15 \\ -\ 8 \\ \hline \end{array}$$

3. Use counters to find how many are left:

a.	b.	c.	d.	e.	f.	g.	h.	i.
17	15	16	14	12	9	8	13	15
− 8	− 6	− 9	− 7	− 5	− 5	− 2	− 6	− 8
9	9	7	7	4	4	6	7	7

4. Barbara has 14¢. She owes Jim 9¢. How much will she have left after she pays Jim?

$$\begin{array}{r} 14¢ \\ -\ 9 \\ \hline \end{array} = \begin{array}{l} \text{10 pennies and 4 pennies} \\ -\ \text{9 pennies} \\ \hline \text{1 penny and 4 pennies} = \ ? \end{array}$$

5. Give the subtraction facts in 10:

10	10	10	10	10	10	10	10	10
− 8	− 6	− 3	− 9	− 4	− 2	− 7	− 1	− 5
2	4	7	1	6	8	3	9	5

6. Subtract:

$$\begin{array}{r} 13 \\ -\ 9 \\ \hline 4 \end{array} = \begin{array}{l} \text{10 ones and 3 ones} \\ -\ \text{9 ones} \\ \hline \text{? ones and 3 ones} = \ ? \end{array}$$

Practice in Subtracting

1. Write these exercises. See how many you know at once:

a.	b.	c.	d.	e.	f.	g.	h.	i.
8	9	5	8	6	7	4	6	9
− 4	− 5	− 3	− 1	− 3	− 4	− 2	− 4	− 3
4	4	3	7	3	3	2	2	6

2. Use your counters to find how many are left:

14	12	13	16	17	18	17	16	12
− 6	− 8	− 7	− 7	− 9	− 9	− 8	− 9	− 9
8	4	6	9					
11	16	12	13	14	11	13	12	13
− 4	− 9	− 6	− 6	− 9	− 3	− 4	− 5	− 4

3. Subtract by changing the 1 ten to 10 ones as we have done in the box:

$$\begin{array}{r} 13 \\ -\ 9 \\ \hline \end{array} = \begin{array}{l} 10 \text{ ones and } 3 \text{ ones} \\ -\ 9 \text{ ones} \\ \hline \end{array} = ?$$

15	17	13	12	11	16	15	13	15
− 6	− 8	− 4	− 5	− 7	− 8	− 7	− 6	− 9

4. Use your counters if you need them to find how many are left. Then cover your answers and try to give the answers from memory.

16	12	13	14	15	12	14	15	11
− 8	− 7	− 8	− 5	− 9	− 4	− 6	− 8	− 2
11	12	13	14	15	11	12	13	14
− 7	− 8	− 5	− 8	− 6	− 8	− 9	− 7	− 7

5. Helen had 14 cookies. She ate 5 of them. How many cookies did she have left?

6. David had 17 marbles. He gave 9 of them to Joe. How many marbles did David have left?

Barbara Plays School with Her Pets

Barbara is playing school. She asked her cat how many 4 and 4 are. Snowball mewed 8 times. She asked her pet squirrel how many 2 nuts and 1 more nut are. The squirrel gave 3 little chirps. Barbara's dog, Champ, didn't know any of the answers. He went into the dog house!

See how many answers you know.

Add:

	a.	b.	c.	d.	e.	f.	g.	h.	i.
1.	6	4	9	3	5	6	7	4	3
	3	2	0	4	3	1	2	3	2
	9	6	9	7	8	7	9	7	5
2.	4	3	2	3	3	6	9	4	8
	5	6	2	3	5	7	6	7	9
	9	9	4	9	8	13	15	11	10
3.	7	6	4	7	9	8	9	4	5
	9	7	7	3	9	6	9	6	9
	16	13	11	10	18	14	18	10	14

Subtract:

4.	8	9	7	5	3	6	3	4	5
	− 5	− 5	− 1	− 2	− 1	− 5	− 2	− 1	− 4
	3	4	5	3	2	1	1	3	1
5.	9	8	7	8	7	9	8	6	7
	− 4	− 3	− 5	− 2	− 2	− 7	− 4	− 4	− 3
	5	5	2	6	5	2	4	2	4
6.	15	18	16	12	14	16	17	18	13
	− 9	− 9	− 9	− 8	− 8	− 7	− 8	− 8	− 5
	6	9	7	4	6	9	9	10	8

Review — Some Addition and Subtraction Facts

Working with Our Counters

1. Put 17 counters on your desk. You may use buttons, pieces of paper, bottle caps, or anything you have.

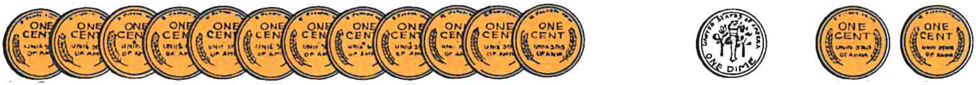
a. Put 10 of the counters in one group, and the rest of them in another group like this:

● ● ● ● ● ● ● ● ● ●   ● ● ● ● ● ● ●

b. How many groups of 10 ones are there in 17?

c. How many ones are left after you have put 10 ones in a group?

2. Look at these coins:



a. Does 1 dime have the same value as 10 pennies?

b. How many whole groups of 10 are there in 12 things?

c. What figure in 12 stands for a group of 10 ones?

3. Count these dots:

● ● ● ● ● ● ● ● ● ●   ● ● ● ● ● ● ● ● ● ●   ● ● ● ●

a. Does the number name twenty-four say that there are twenty and four? Why?

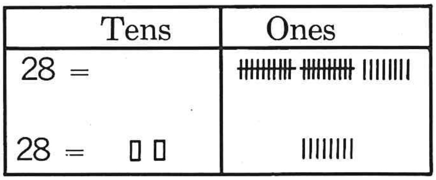
b. How many whole groups of 10 dots make 20 dots?

c. Are 24 dots equal to two groups of 10 dots and four more dots? Why?

d. What figure in 24 stands for 20 or two groups of 10?

When we count things one at a time, we call them ones. When we put something in place of a group of 10 ones, we call it a **ten.**

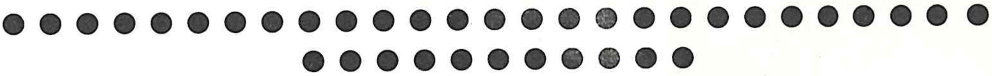
The figure on the left in a 2-figure number is in *tens place.* The figure on the right is in *ones place.*



Naming the Places in a 2-Figure Number

Tens and Ones

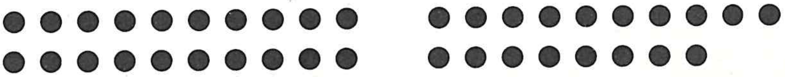
1. Count these dots:



a. Does the number thirty-eight tell you that you have counted thirty and eight, one at a time?

b. Do you see 30 in the number 38? Does the 3 have anything to do with the 30 things in 38 things?

c. Count the dots. Are there 38?



d. When you counted the three groups of ten did you get thirty (30)?

e. If we use a large counter to stand for each group of ten, and small ones for the single ones, we have:

1 ten 1 ten 1 ten 8 ones = 38.

There are 3 tens and 8 ones in 38. The 3 on the left tells the number of tens, while the 8 on the right tells the number of ones.

2. We do not always use groups of tens and ones as we see them in numbers. We can find other parts of tens and ones which we can use. The picture here uses ▯ for 1 ten, 𝍸 for 10 ones, and ǀ for a one. Explain each line:

38 = 3 tens and 8 ones
38 = 2 tens and 18 ones
38 = 1 ten and 28 ones
38 = 0 tens and 38 ones

38	
Tens	Ones
▯ ▯ ▯	ǀǀǀǀǀǀǀǀ
▯ ▯	𝍸 ǀǀǀǀǀǀǀǀ
▯	𝍸 𝍸 ǀǀǀǀǀǀǀǀ
	𝍸 𝍸 𝍸 ǀǀǀǀǀǀǀǀ

Getting Ready for School

Jim and Barbara had some money in their piggy banks. They decided to spend it for some things which they needed for school.

Jim's bank had 3 dimes and 6 pennies in it. Barbara's had 2 dimes and 8 pennies in it. They can write these amounts as:

3 dimes and 6 pennies = 36¢
2 dimes and 8 pennies = 28¢

What number in 28¢ tells you how many dimes there are? Can you tell why the dimes place is the same as tens place?

Why is $.08 written as a ones number? What number shows there are no dimes (tens)?

If you have less than a dollar, and want to use the $ sign, something has to be written to tell you that you have cents. Do you know what it is? Look at the two ways that 8 cents may be written (8¢, $.08) and see if you can tell. See if these things are true:

a. Cents can be dimes and pennies if you have more than 9. They are written as tens and ones. Why?

b. We must place a period, called the cents sign, on the left of dimes or tens if we write 36¢ as $.36 or 8¢ as $.08. Why?

1. Write these amounts in two other ways:

a. nineteen cents
d. two cents
g. fifteen cents
b. fourteen cents
e. four cents
h. ten cents
c. six cents
f. eleven cents
i. thirty cents

2. 14¢ = ? ten and ? ones. 24¢ = ? tens and ? ones.

Writing Cents Correctly

Getting Shopping Ideas from the Newspaper

As soon as the paper came, Jim and Barbara looked at the comic page first of all. Then Barbara saw a picture on another page of the paper. It was an ad for school things.

Barbara said, "I want to buy a fingernail file, a comb, and a mirror to keep in my desk at school. This is the list she made:

Comb	10¢
Mirror	15¢
Nail file	10¢

Then she said, "The prices could be written as $.10, $.15, and $.10, couldn't they, Jim?"

$.10
$.15
$.10

Do you think this way of writing the prices would be correct?

Jim said, "I need so many things, I just don't know where to begin. My list would be a mile long."

He wrote these things on a sheet of paper:

Pencil	10¢	Notebook	18¢
Ruler	12¢	Paper clips	9¢
Bottle of paste	15¢	Red pencil	7¢
Eraser	10¢	Crayons	14¢

Was Jim's list a mile long?

1. Write each price in Jim's list by using the dollar sign and the cent point.

2. Write these amounts in two other ways:

a. thirty-four cents **b.** thirty cents **c.** $.01
d. twelve cents **e.** 20¢ **f.** $.10

3. Write 2 dimes and 7 cents three other ways.

Ways of Writing Money — Cents

Barbara and Jim Do Some Figuring

Jim	Barbara
3 dimes	$.20
1 nickel	$.05
4 pennies	$.07

Jim counted his money again. He wrote 3 dimes, 1 nickel, and 4 pennies. Barbara wrote $.20, $.05, and $.07.

Jim and Barbara would like to know how much money they have to spend.

Find how much Barbara has by adding in your head. How much is $.20 and $.05? How much is $.07 more?

Now add Jim's money in your head. How much money is 3 dimes? How much is 30¢ and 1 nickel? Add 4 pennies to this amount. Who has the most money?

Jim has the most money, so he said he would pay both Barbara's and his own bus fare on shopping day. The round trip fare for each of them was 14¢. How would you find the total amount of the fares?

The twins used tens and ones in their figuring.

$$\begin{array}{r} 14\text{¢} \\ +\,14\text{¢} \\ \hline \end{array} = \begin{array}{rl} & 1 \text{ ten and } 4 \text{ ones} \\ + & 1 \text{ ten and } 4 \text{ ones} \\ \hline & 2 \text{ tens and } 8 \text{ ones} = 28\text{¢} \end{array}$$ Why?

Add, by writing the tens and ones:

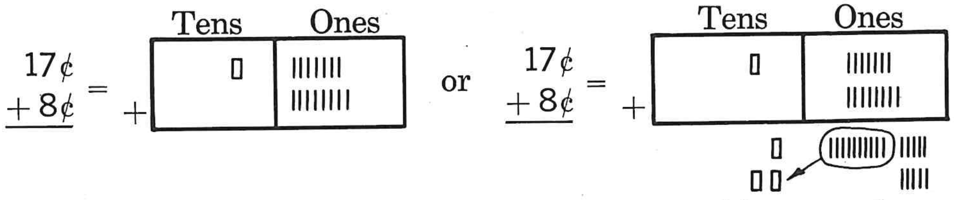
	a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
1.	13¢ 16¢ 29	15¢ 12¢ 27	17¢ 11¢ 28	12¢ 16¢ 28	13¢ 13¢ 26	14¢ 15¢ 19	$.12 .17	$.10 .18
2.	23 15	16 22	13 24	12 26	27 11	24 15	22 16	18 20
3.	12 7	13 6	10 9	11 6	15 3	1 17	14 5	2 16

Addition — Using Tens and Ones

Barbara and Jim Watch the Ads in the Paper

Barbara wanted to buy a hair ribbon for 17¢ and a comb for 8¢. How much would both of these things cost?

This is the way she found the answer:



This is how she could have used numbers to add tens and ones:

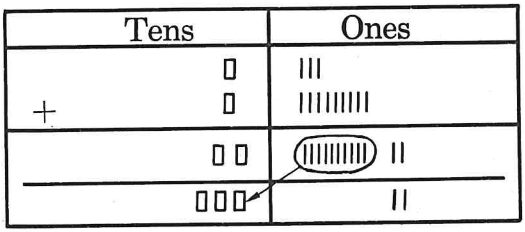
17¢ = 1 ten and 7 ones
+ 8¢ = + 8 ones
25¢ = 1 ten and 15 ones = 2 tens and 5 ones = 25¢ Why?

Barbara could have found the answer another way. 17¢ + 8¢ = 1 ten and 7 ones and 8 ones = 2 tens and 5 ones. Why?

Barbara wondered if she could buy a pad of paper for 13¢ and a scarf for 19¢. Can you add these?

13¢ = 1 ten and 3 ones = ▯ |||
+ 19¢ = + 1 ten and 9 ones = + ▯ |||||||||

Add the ones first. 9 ones and 3 ones are 12 ones. 12 ones = 1 ten and 2 ones. Why? Write 2 in ones place in the answer and hold the 1 ten.



Add the tens. 1 ten and 1 ten are 2 tens. Then add the 1 ten held from the ones column. We have 3 tens. Write 3 in tens place in the answer.

Our answer is 3 tens and 2 ones = 32¢. Why?

Shopping Day at Last

1. How much did Barbara pay for socks if she bought 2 pairs at 19¢ a pair?

2. Barbara bought a comb for 8¢ and a fingernail file for 10¢. Find the cost of both of these things.

3. Jim bought 2 pairs of socks at 18¢ a pair. How much did both pairs cost?

4. Barbara and Jim met their friend Mary down town. Mary had bought a jack-in-the-box for herself that cost 12¢. She had bought one for her brother, also. How much did she spend for the two toys?

5. Barbara treated Jim and herself to ice cream at the drug store. How much did she spend if each one had a 13¢ cone?

6. Jim bought something to surprise Barbara. When she wasn't looking, he bought two of these for her hair. How much did both of them cost if the price of one was 9¢?

7. As they passed the pet shop, they saw 18 little black puppies in one cage, and 13 small brown puppies in another one. "Oh, look," said Jim. How many puppies did they see altogether?

8. Barbara saw the clock in the pet shop. It was 3 o'clock. "Mother said we must be home by 4 o'clock," Barbara told Jim. How much time did they have left?

9. Jim had one more thing to buy. He needed 2 more handkerchiefs, so that he would have one for each day of the week. The kind he wanted cost 14¢ each. Find how much both of them cost.

Problem Solving

Jim and Barbara Buy a Gift for Their Mother

Jim and Barbara are in town shopping for school. They have bought everything they needed. Barbara said, "I have some money left. Let's put our money together and buy something for Mother."

Barbara has 13¢. Jim has 15¢. They need to know how much money they have in all for their mother's gift.

$$\begin{array}{r} 13\text{¢} \\ +\,15\text{¢} \\ \hline 28\text{¢} \end{array}$$

Tell how you know that they have 28¢ in all. "What could we get for only 28¢?" asked Jim. Barbara saw a box of bobby pins.

"That is just what Mother needs. She has lost most of hers." The box of bobby pins costs 25¢. Can they buy the bobby pins?

$$\begin{array}{r} 28\text{¢} \\ -\,25\text{¢} \\ \hline \end{array} = \begin{array}{r} \text{2 dimes and 8 pennies} \\ -\,\text{2 dimes and 5 pennies} \\ \hline \text{3 pennies} \end{array}$$

A dime is the same as a ten, isn't it?

They can buy the bobby pins and have 3¢ left.

Do this using tens and ones instead of dimes and pennies:

$$\begin{array}{r} 28 \\ -\,25 \\ \hline \end{array} = \begin{array}{r} \text{2 tens and 8 ones} \\ -\,\text{2 tens and 5 ones} \\ \hline \text{3 ones} \end{array}$$

Subtract by writing tens and ones:

	a.	b.	c.	d.	e.	f.	g.	h.
1.	$\begin{array}{r} 29\text{¢} \\ -\,15\text{¢} \\ \hline \end{array}$	$\begin{array}{r} 36\text{¢} \\ -\,14\text{¢} \\ \hline \end{array}$	$\begin{array}{r} 34\text{¢} \\ -\,20\text{¢} \\ \hline \end{array}$	$\begin{array}{r} 27\text{¢} \\ -\,12\text{¢} \\ \hline \end{array}$	$\begin{array}{r} 37 \\ -\,23 \\ \hline \end{array}$	$\begin{array}{r} 39 \\ -\,16 \\ \hline \end{array}$	$\begin{array}{r} 28 \\ -\,14 \\ \hline \end{array}$	$\begin{array}{r} 26 \\ -\,12 \\ \hline \end{array}$
2.	$\begin{array}{r} 18 \\ -\,4 \\ \hline \end{array}$	$\begin{array}{r} 26 \\ -\,6 \\ \hline \end{array}$	$\begin{array}{r} 19 \\ -\,5 \\ \hline \end{array}$	$\begin{array}{r} 37 \\ -\,14 \\ \hline \end{array}$	$\begin{array}{r} 34 \\ -\,22 \\ \hline \end{array}$	$\begin{array}{r} 31 \\ -\,11 \\ \hline \end{array}$	$\begin{array}{r} 30 \\ -\,20 \\ \hline \end{array}$	$\begin{array}{r} 35 \\ -\,25 \\ \hline \end{array}$

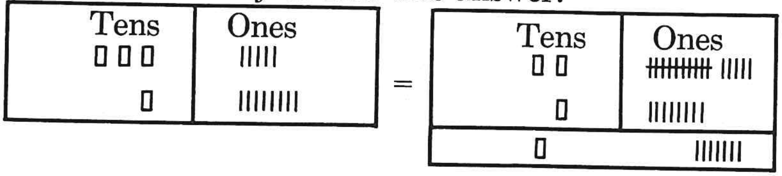
Let's Subtract

Mike is getting ready for school, too. He saw just the kind of notebook he wanted. It cost 35¢. He had saved 18¢. "How much more money do I need?" he thought.

This is how he figured it. "From 18¢ to 20¢ is 2¢; from 20¢ to 30¢ is 10¢. That makes 12¢ that I need so far. Then from 30¢ to 35¢ is 5¢. Add the 5¢ to the 12¢, and I need 17¢.

Let's learn another way to find this answer:

$$\begin{array}{r} 35 \\ -\,18 \\ \hline 17 \end{array} =$$



$$\begin{array}{r} 35¢ \\ -\,18¢ \\ \hline \end{array} = 17$$

You couldn't take 8 ones from 5 ones, so you used a ten to make more ones. 1 ten is the same as 10 ones. These 10 ones and the 5 ones gave 15 ones. Then you could subtract 8 ones from 15 ones.

You have 7 ones left. You wrote the 7 in ones place in the answer. You used 1 ten out of the 3 tens, so you had 2 tens left. 1 ten from 2 tens is 1 ten. You wrote the 1 in tens place in the answer.

Find the answer for this one:

$$\begin{array}{r} 30 \\ -\,14 \\ \hline \end{array} = \begin{array}{cc} \text{Tens} & \text{Ones} \\ 3 & 0 \\ -\,1 & 4 \\ \hline \end{array} = \begin{array}{cc} \text{Tens} & \text{Ones} \\ ? & ? \\ -\,1 & -\,4 \\ \hline ? & ? \end{array} = ?$$

1. Use counters of tens and ones to do these:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
31	24	32	23	28	52	34	30	33
− 28	− 19	− 17	− 14	− 19	− 16	− 17	− 21	− 17

Counters — Changing Tens to Ones

Change from a Sale

Jim gave the clerk a quarter and a dime to pay for a toy airplane that cost 26¢. The clerk gave Jim back 4 pennies and a nickel, saying, "26 out of 35¢; 27, 28, 29, 30, and 5 are 35 – 9¢ change." Why?

Just to be sure that the 9¢ change is correct, check it for Jim by subtraction.

$$\begin{array}{r} \overset{2}{\cancel{3}}5\text{¢} \\ -\ 26\text{¢} \\ \hline 0 \end{array} = \begin{array}{r} \text{3 dimes and 5 cents} \\ -\ \text{2 dimes and 6 cents} \\ \hline \end{array}$$

You cannot take 6¢ away from 5¢. So, before you subtract you change a dime into pennies.

$$\begin{array}{r} 35\text{¢} \\ -\ 26\text{¢} \\ \hline \end{array} = \begin{array}{r} \text{3 dimes and 5 cents} \\ -\ \text{2 dimes and 6 cents} \\ \hline \end{array} = \begin{array}{r} \text{2 dimes and 15 cents} \\ -\ \text{2 dimes and \ 6 cents} \\ \hline \text{9 cents} \end{array}$$

Jim wanted to check his answer. He said to himself, "If I add the amount of money I spent and the amount of money I received in change, I should have the amount with which I started."

$$\begin{array}{l} 26\text{¢} = \text{what he spent} \\ \underline{\ 9\text{¢}} = \text{his change} \end{array} = \begin{array}{r} \text{2 dimes and \ 6 cents} \\ +\ \text{9 cents} \\ \hline \text{2 dimes and 15 cents} \end{array} = \text{3 dimes and 5 cents}$$

1. Barbara gave Jim 27 of the 35 trading cards she had saved. See how many Barbara had left.

$$\begin{array}{r} 35 \\ -\ 27 \\ \hline \end{array} = \begin{array}{r} \text{3 tens and 5 ones} \\ -\ \text{2 tens and 7 ones} \\ \hline \end{array} = \begin{array}{r} \text{2 tens and 15 ones} \\ -\ \text{2 tens and \ 7 ones} \\ \hline \text{? tens and \ ? ones} \end{array} = \ ?$$

2. Do these by writing the tens and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
17¢	16¢	28¢	36¢	37	25	$.35	$.38
– 9¢	– 8¢	– 19¢	– 18¢	– 18	– 17	– .18	– .19

Writing Tens and Ones in Subtraction — Needing More Ones

Practice Exercises

1. Why do you add the ones first in an addition problem?

2. If you are adding money, what could you use instead of ones and tens?

3. Give the answers to these from memory:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
6	9	8	7	5	8	4	7	5
+ 7	+ 5	+ 8	+ 5	+ 4	+ 3	+ 9	+ 9	+ 5

4. Add, by writing tens and ones:

12	8	13	8	25	13	16	36	18
5	9	9	17	15	17	16	3	17

5. Add:

22	26	13	15	18	20	34	16	18
5	10	14	19	12	10	10	17	7

6. Give the answers to these from memory:

12	8	5	9	6	13	14	7	9
– 8	– 3	– 2	– 6	– 4	– 7	– 8	– 3	– 4

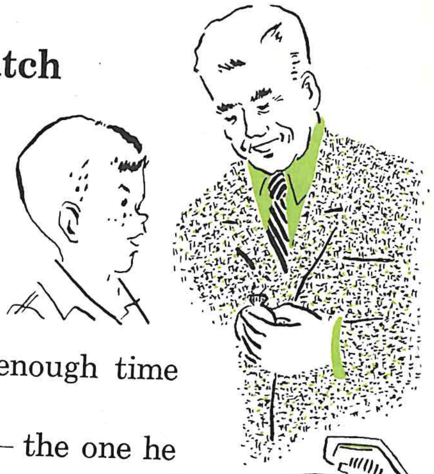
7. Subtract, by writing tens and ones:

21	14	37	30	28	31	35	11	16
– 16	– 9	– 18	– 16	– 19	– 15	– 23	– 9	– 9

8. Subtract:

21	30	25	28	19	34	27	20	22
– 19	– 24	– 18	– 19	– 11	– 28	– 18	– 14	– 18
32	26	15	38	20	33	30	28	31
– 19	– 17	– 9	– 29	– 17	– 19	– 23	– 12	– 15

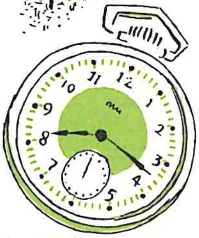
Grandfather's Watch



Mike was trying to figure out one thing. He wanted to know why grown-ups always say, "The older I get, the faster time goes."

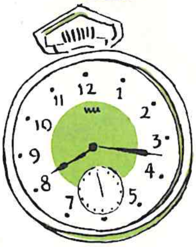
His grandfather said, "Mike, time really doesn't go faster. It just seems that way because there never seems to be enough time to do the things you want to do."

Then Grandfather got out his old watch — the one he used when he worked on the railroad. These are some of the things he told Mike.

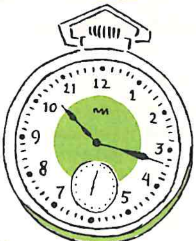


"There is one minute between each colored mark. You see that it is now 1 minute past 10 o'clock. Count the colored marks to find how many minutes there are in an hour."

It took Mike a while to count the minutes in an hour. How many minutes are there in one hour?



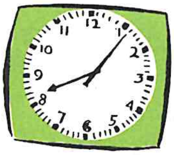
Grandfather said, "You could count the minutes in an hour faster if you remember that there are five minutes between each number." Help Mike count between the numbers to find the minutes in an hour. You can count by 5's: 5, 10, 15, and so on.

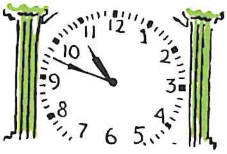


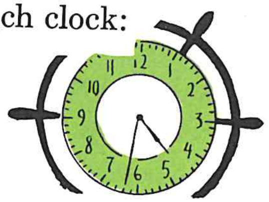
Grandfather asked Mike what time his watch showed now. Mike counted: "Five, ten, fifteen, sixteen, seventeen." Then Mike said, "It is 17 minutes past 10."

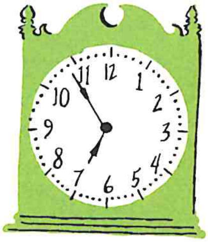
Grandfather said, "A person working for the railroad, for instance, might say that it is 10:17."

Tell the time shown by each clock:



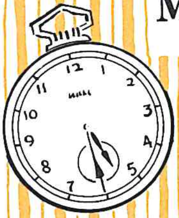






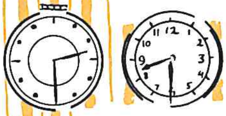
Reviewing Minutes and Five-Minute Intervals

Mike Learns More about Telling Time



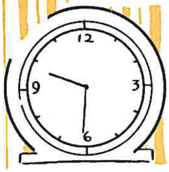
Grandfather told Mike that an hour can be divided into half hours. It is half-past the hour when the minute hand points to 6. It is 30 minutes past 5 on this watch. Count by 5's to be sure it is 30 minutes past 5.

Grandfather says it is 5:30. Is he right?

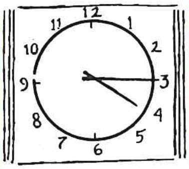


Both of these watches show half hours. Tell what time it is on each of the two watches.

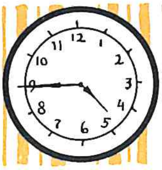
An hour can be divided into quarters, or one-fourth hours.



Quarter hours.



When the minute hand points to 3, we can say it is 15 minutes after 4, or a quarter past 4.

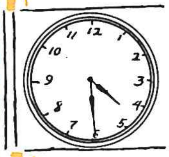


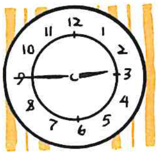
When the minute hand points to 9, we can say it is 15 minutes to 5, or a quarter to 5.

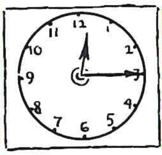
Why does the second watch tell that it is 15 minutes past 4, or 4:15?

Why does the third watch tell that it is 15 minutes to 5, or 4:45? Count by 5's to be sure it is 4:45.

1. Tell the time on each clock pictured here:







2. Mike said, "Mother told me to be home at a quarter to 11." Draw a clock showing the time Mike must be home.

Quarter and Half Hours

A.M. and P.M.

There is going to be a pet show in the school yard this coming Saturday at 8 A.M. Jim wouldn't miss it for anything. He is going to bring his pet turtle.

The thing Jim wants to know is whether 8 A.M. means in the morning or in the evening.

His mother said, "A.M. means from 12 o'clock midnight until noon the next day."

A.M.

12:00 A.M. midnight

7:30 A.M.

It is almost noon

Then his mother said, "P.M. means from 12 o'clock at noon until 12 o'clock midnight."

P.M.

12:00 P.M. noon

3:30 P.M.

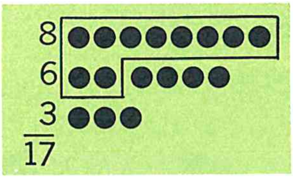
It is almost midnight

Do you see that there are 24 hours in a day and night? We usually say there are 24 hours in a day, but this means a day and a night.

Cooling Off after School

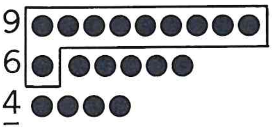
Sometimes it is so hot that the boys can hardly wait until they get to the swimming pool. Charles is usually the first one in the pool.

Charles is learning to dive. He dived 8 times and then he rested. Then he dived 6 more times. Just before he went home he was brave enough to dive from the high board 3 times. How many times did he dive altogether?



You want to add 8 and 6 first. You may not know the answer right off. Find it by building a ten. 8 and 2 more are 10. 10 and 4 = 14. So 8 and 6 = 14. 14 and 3 = 17.

Add these the same way:



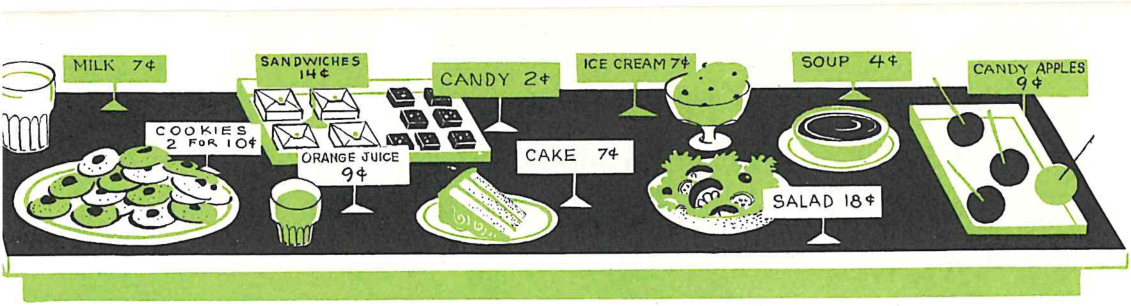
9 + 6 = 9 + 1 + 5 = 30 + 5 = 35.

? + 4 = ?.

1. Add, using counters to build a ten:

a.	b.	c.	d.	e.	f.	g.	h.	i.
9	4	6	6	7	8	9	8	6
8	7	4	9	6	4	3	8	4
3	5	5	2	1	4	2	2	4
20	16	15	17	14	16	14	18	14

Building a Ten in Column Addition



Jim and Barbara Buy Lunch

Jim wanted salad, milk, and soup for lunch. Can you explain his figuring?

Adding downward:

Salad	18¢		1 ten and 8 ones
Milk	7¢	=	7 ones
Soup	+ 4¢	+	4 ones
	29¢		2 tens and 9 ones

8 + 7 = 8 + 2 + 5 = 10 + 5 = 15.
15 + 4 = 19.

Write 9 in ones place in the answer and hold the 1 ten.

Adding 1 ten and the 1 ten (held) you have 2 tens. Write 2 in tens place in the answer.

Check the above answer by adding upward:

Salad	18¢	4¢ + 7¢ = 11¢
Milk	7¢	11¢ + 8¢ = 19¢
Soup	+ 4¢	19¢ = 1 dime + 9 cents.
	9¢	Write the 9 in ones place in the answer and hold the 1 ten or 1 dime.

18¢
7¢
+ 4¢
29¢

The 1 in 18¢ is 1 ten or 1 dime.
1 ten + the 1 ten (held) = 2 tens.
Write 2 in tens place in the answer.

1. Barbara thought she might get a salad for 18¢, a sandwich for 14¢, and 1 cookie for 5¢. What would this lunch cost?

2. If Barbara wanted to buy a sandwich for 14¢, milk for 7¢, and cake for 7¢, what would be the total cost?

Building Tens in Column Addition

How Well Have You Learned Addition?

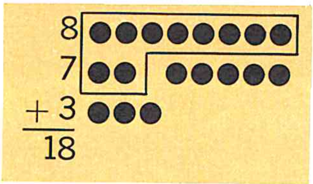
Harry had a problem where addition was needed to find an answer. His way of showing the meaning of addition was with counters:

$$\begin{array}{r} 8 \\ 7 \\ +3 \\ \hline ? \end{array}$$

●●●●●●●● + ●●●●●●● + ●●●

8 ones 7 ones 3 ones

He said we could add the numbers this way:



He builds a ten. $8 + 7 = \ \ ?$
See the 7 as 2 and 5; then $8 + 7 = 8 + 2 + 5$.

Now $8 + 2 = 10$ and $10 + 5 = 15$. Then $15 + 3 = 18$.

Sam said that he did not need to think a ten. He just knew that $8 + 7 = 15$ and $15 + 3 = 18$.

Joe said he used ways like this to help him:

$\begin{array}{r} 8 \\ +7 \\ \hline \end{array}$ $7 + 7 = 14$. Then, $8 + 7 = 14 + 1 = 15$.

$\begin{array}{r} 8 \\ +7 \\ \hline \end{array}$ $8 + 8 = 16$. Then, $8 + 7 = 16 - 1 = 15$.

1. Add downward and check by adding upward:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
8	7	5	7	6	6	4	8	9
6	5	9	7	7	9	8	3	3
3	1	2	4	4	3	4	5	4

2. One week John carried 5 letters, 8 letters, 4 letters, 2 letters, 1 letter, and 3 letters to the mailbox. How many letters did he carry in all?

3. The mailman gave 3 packages to John to take home. One weighed 9 lb., another weighed 4 lb., and the third one weighed 2 lb. How many pounds did John have to carry home?

Practice Work in Addition

1. Add, writing tens and ones:

a.	b.	c.	d.	e.	f.	g.	h.	i.
25	22	18	9	6	9	15	25	27
8	9	8	17	19	24	7	6	5

2. Add these downward by building ten:

6	7	8	5	4	7	9	6	5
9	4	8	9	8	7	9	6	8
3	1	0	2	3	4	2	5	2

3. Add by writing tens and ones. Add downward and check by adding upward:

12	15	11	20	11	13	14	15	6
12	12	13	6	11	15	14	15	22
12	8	10	5	11	5	10	6	5

4. Add, thinking tens and ones:

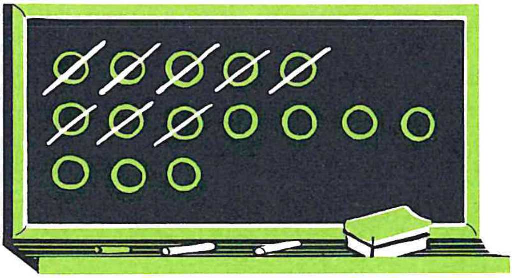
17	27	19	29	28	25	18	15	13
9	9	7	7	5	8	15	8	16
								9

10	16	19	14	6	9	5	7	6
15	18	5	16	19	10	15	17	18
8	4	13	7	12	18	15	3	4

5. See how many addition facts you know at sight. Do not write these facts on paper:

6	5	3	7	9	6	4	6	8
4	5	2	7	1	7	3	1	8

6	4	3	8	4	7	6	3	7
6	5	4	9	4	8	5	3	4



Using the Blackboard

Jerry likes to use the blackboard at school and the one at home, too. He practices his subtraction sometimes at home. His mother gives him problems.

$$\begin{array}{r} 15 \\ -\ 8 \\ \hline \end{array}$$

Jerry writes fifteen 0's on the blackboard. He then crosses out 8 of them.

He counts to see how many are left. How many 0's did Jerry count?

1. Jerry had 17 tiddly-winks. His baby sister threw 9 of them on the floor. How many did Jerry have left?

2. If Jerry's mother gives him 32 take away 17, he can do it two ways for practice.

a. Writing tens and ones:

$$\begin{array}{r} 32 \\ -\ 17 \\ \hline \\ \end{array} = \begin{array}{r} \text{3 tens and 2 ones} \\ -\ \text{1 ten and 7 ones} \\ \hline \\ \end{array} = \begin{array}{r} \text{2 tens and 12 ones} \\ -\ \text{1 ten and 7 ones} \\ \hline \text{1 ten and 5 ones} \end{array} \begin{array}{l} \\ \\ = 15 \end{array} \qquad \begin{array}{r} 32 \\ -\ 17 \\ \hline 15 \end{array}$$

b. Thinking tens and ones:

$$\begin{array}{r} 32 \\ -\ 17 \\ \hline 5 \end{array}$$

I cannot take 7 ones from 2 ones. I change one of the 3 tens to 10 ones; 10 ones + 2 ones = 12 ones. 7 ones from 12 ones = 5 ones. Write 5 in ones place in the answer.

$$\begin{array}{r} 32 \\ -\ 17 \\ \hline 15 \end{array}$$

I used 1 ten out of the 3 tens, so I subtract 1 ten from 2 tens. 2 tens − 1 ten = 1 ten. Write 1 ten in tens place in the answer.

3. Mary has an allowance of 35¢ each week. If she bought school supplies that cost 28¢, how much of her allowance did she have left?

4. Think the tens and ones as you do these (check answers):

$$\begin{array}{r} 38 \\ -\ 24 \\ \hline \end{array} \quad \begin{array}{r} 26 \\ -\ 13 \\ \hline \end{array} \quad \begin{array}{r} 35 \\ -\ 12 \\ \hline \end{array} \quad \begin{array}{r} 37 \\ -\ 13 \\ \hline \end{array} \quad \begin{array}{r} 18 \\ -\ 11 \\ \hline \end{array} \quad \begin{array}{r} 25 \\ -\ 12 \\ \hline \end{array} \quad \begin{array}{r} 35 \\ -\ 34 \\ \hline \end{array} \quad \begin{array}{r} 34 \\ -\ 18 \\ \hline \end{array}$$

How Well Have You Learned Subtraction?

1. Do these subtractions writing out tens and ones:

$$\begin{array}{r} 34 \\ -\ 19 \\ \hline \end{array} = \begin{array}{r} \text{3 tens and 4 ones} \\ -\ \text{1 ten and 9 ones} \\ \hline \end{array} = \begin{array}{r} \text{2 tens and 14 ones} \\ -\ \text{1 ten and 9 ones} \\ \hline \text{1 ten and 5 ones} \end{array}$$

a.	b.	c.	d.	e.	f.	g.	h.
$\begin{array}{r}31\\-13\\\hline\end{array}$	$\begin{array}{r}27\\-18\\\hline\end{array}$	$\begin{array}{r}32\\-15\\\hline\end{array}$	$\begin{array}{r}36\\-19\\\hline\end{array}$	$\begin{array}{r}33\\-16\\\hline\end{array}$	$\begin{array}{r}23\\-17\\\hline\end{array}$	$\begin{array}{r}30\\-17\\\hline\end{array}$	$\begin{array}{r}28\\-19\\\hline\end{array}$

2. Use part of 10 to find these facts:

$$\begin{array}{r} 16 \\ -\ 7 \\ \hline \end{array} = \begin{array}{r} 10 + 6 \\ -\ 7 \quad \\ \hline ? + 6 \end{array} = ? \qquad \begin{array}{r} 14 \\ -\ 9 \\ \hline \end{array} = \begin{array}{r} 10 + 4 \\ -\ 9 \quad \\ \hline ? + 4 \end{array} = ?$$

$$\begin{array}{r} 17 \\ -\ 8 \\ \hline \end{array} = \begin{array}{r} 10 + 7 \\ -\ 8 \quad \\ \hline \end{array} = ?$$

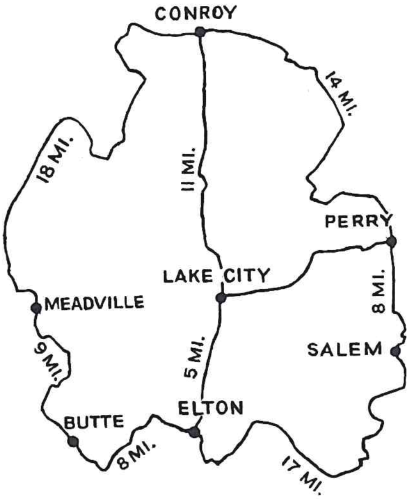
3. Do these subtraction exercises. Use part of 10 if it will help you find the facts. Learn all number facts that you do not know:

a.	b.	c.	d.	e.	f.	g.	h.
$\begin{array}{r}10\\-1\\\hline\end{array}$	$\begin{array}{r}11\\-2\\\hline\end{array}$	$\begin{array}{r}12\\-5\\\hline\end{array}$	$\begin{array}{r}9\\-6\\\hline\end{array}$	$\begin{array}{r}14\\-7\\\hline\end{array}$	$\begin{array}{r}11\\-8\\\hline\end{array}$	$\begin{array}{r}13\\-9\\\hline\end{array}$	$\begin{array}{r}9\\-1\\\hline\end{array}$
$\begin{array}{r}11\\-4\\\hline\end{array}$	$\begin{array}{r}13\\-5\\\hline\end{array}$	$\begin{array}{r}10\\-6\\\hline\end{array}$	$\begin{array}{r}15\\-7\\\hline\end{array}$	$\begin{array}{r}14\\-8\\\hline\end{array}$	$\begin{array}{r}12\\-3\\\hline\end{array}$	$\begin{array}{r}5\\-3\\\hline\end{array}$	$\begin{array}{r}5\\-2\\\hline\end{array}$
$\begin{array}{r}12\\-4\\\hline\end{array}$	$\begin{array}{r}14\\-5\\\hline\end{array}$	$\begin{array}{r}11\\-6\\\hline\end{array}$	$\begin{array}{r}14\\-9\\\hline\end{array}$	$\begin{array}{r}11\\-9\\\hline\end{array}$	$\begin{array}{r}6\\-3\\\hline\end{array}$	$\begin{array}{r}6\\-2\\\hline\end{array}$	$\begin{array}{r}13\\-4\\\hline\end{array}$
$\begin{array}{r}12\\-6\\\hline\end{array}$	$\begin{array}{r}16\\-7\\\hline\end{array}$	$\begin{array}{r}12\\-8\\\hline\end{array}$	$\begin{array}{r}14\\-6\\\hline\end{array}$	$\begin{array}{r}8\\-5\\\hline\end{array}$	$\begin{array}{r}7\\-4\\\hline\end{array}$	$\begin{array}{r}8\\-3\\\hline\end{array}$	$\begin{array}{r}15\\-9\\\hline\end{array}$
$\begin{array}{r}10\\-7\\\hline\end{array}$	$\begin{array}{r}12\\-9\\\hline\end{array}$	$\begin{array}{r}16\\-8\\\hline\end{array}$	$\begin{array}{r}13\\-7\\\hline\end{array}$	$\begin{array}{r}15\\-6\\\hline\end{array}$	$\begin{array}{r}9\\-5\\\hline\end{array}$	$\begin{array}{r}8\\-4\\\hline\end{array}$	$\begin{array}{r}9\\-3\\\hline\end{array}$

A Visit with Grandfather

Bobby and his cousin David were invited to spend a week together at their grandfather's house at Elton. The boys didn't see each other very often. What fun they would have!

Bobby went by bus to his grandfather's house. The bus runs from Meadville through Conroy and Lake City.



Add the miles Bobby traveled, thinking the tens and ones.

Add the ones:

$$\begin{array}{r}18\\11\\+5\\\hline 4\end{array}$$

8 + 1 = 9. 9 + 5 = 9 + 1 + 4 = 10 + 4 = 14. 14 is 1 ten and 4 ones. Write 4 in ones place in the answer. Hold the 1 ten.

Add the tens:

$$\begin{array}{r}18\\11\\+5\\\hline 34\end{array}$$

1 + 1 = 2; 2 + 1 (held from ones column) = 3 tens. Write 3 in tens place in the answer.

Bobby traveled 34 miles.

David traveled from Perry to Salem to Elton. Add the miles he traveled.

Who traveled farther, Bobby or David?

Grandfather took the boys home. They went to Butte and then to Meadville the first day. How far did they travel that day?

Grandfather and David went to Conroy and then on to Perry the second day. Find how far they traveled the second day.

The next day Grandfather went on home via (by way of) Salem. How far did he travel the third day?

Find the distance Grandfather traveled in all 3 days.

Time Out—A Day at the Fair

Jim and Barbara went to the Fair with some of their friends.

1. Jean spent $.15 to ride on the merry-go-round. She also spent $.05 for a pony ride and $.07 for a bottle of soda pop.

a. How much did she spend in all?
b. How much out of 35¢ did she have left?

2. Betty and Bob watched 3 men selling hot dogs. The first man sold 15, the second man sold 5, and the third man sold 10.

a. What was the total number of hot dogs sold?
b. If 4 of these were bought by Bob and Betty, how many were bought by other people?

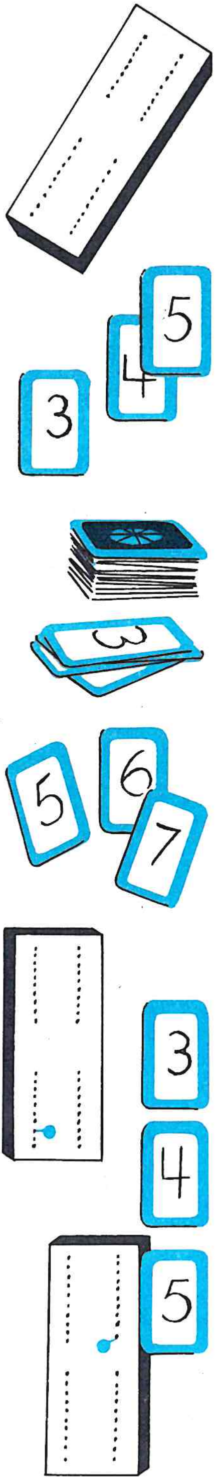
3. A man is selling balloons. They are $.19 each. Bob and his sister each bought one.

a. How much did they cost in all?
b. How much more than 25¢ did they spend?

4. Add these by writing tens and ones for the numbers:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
27¢	14¢	$.09	11¢	19¢	$.22
8¢	18¢	.21	29¢	19¢	.18

Practice Work — Some 2-Question Problems



Jim Plays a New Game

Jim is playing a new game which is much like the cribbage game his father and mother play. Jim and his father made the cribbage board by burning holes in a piece of wood with Jim's wood-burning set. Then they made the cards from pieces of tagboard.

Each player is given 6 cards. The other cards are laid upside down. Each player takes a turn in drawing one card from the pile at a time. Then he discards one card he does not want. When he gets three cards in a series of 2,3,4 or 4,5,6 and so on, he may put these cards in front of him, face down.

Jim got his cards in series of three numbers before any of the other players did. Now he can turn them over and count the points he has.

$$\begin{array}{r} 5 \\ 6 \\ +7 \\ \hline \end{array}$$

5 + 6 = 11. Jim has to remember 11 because he does not see it.

Now he must add 11 + 7. Since he does not see the 11 in the numbers, he calls this a hidden combination; 11 + 7 = 18. Why?

Jim can peg 18 on the cribbage board.

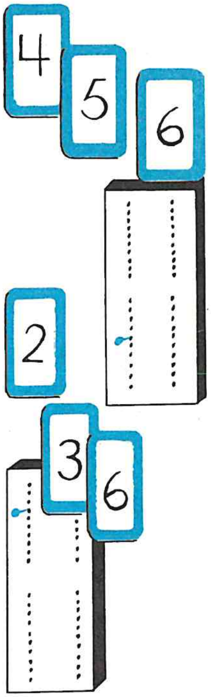
Now Jim counts the points on the other cards he has laid down. How many points does he have?

$$\begin{array}{r} 3 \\ 4 \\ +5 \\ \hline \end{array}$$

3 + 4 = ? This is the number Jim must remember because he does not see it.

Now add 5 to this number, and see if Jim has pegged correctly.

Playing Cribbage



Barbara had three cards in her hand when Jim laid all his cards down. She will first count the points on the cards she has laid down.

$$\begin{array}{r}4\\5\\+6\\\hline\end{array}$$

4 + 5 = 9. Barbara must remember 9 because she does not see it.

Then 9 + 6 = 15.

Barbara can peg at 15.

But now Barbara must count the points on the cards she still had in her hand.

$$\begin{array}{r}2\\3\\+6\\\hline\end{array}$$

2 + 3 = 5. She must remember it because she does not see it.

Then 5 + 6 = 11.

Barbara got caught with 11 points in her hand so she must move her peg back 11 points. Does 11 from 15 = 4?

1. Count these points to see how many you could peg:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
0	2	5	3	4	1	5	3	4
1	3	6	4	5	2	6	4	5
2	4	7	5	6	3	7	5	6

2. Count the points you might lose in each exercise:

2	4	5	3	5	0	1	5	3
3	5	6	4	6	1	2	6	4
6	4	3	6	5	6	4	2	4

3. Add downward:

8	7	5	3	6	4	2	9	8
4	5	6	9	7	9	8	6	8
3	6	8	4	5	3	6	4	3

Practice with Hidden Combinations

Unit Review

1. Which is larger, 2 tens and 16 ones, or 3 tens and 3 ones? How much larger?

2. Jim has 1 dime, 3 nickels, and 8 pennies. Barbara has 35¢. Would you rather have Jim's money or Barbara's?

3. Which will cost more money, enough 2¢ stamps for 12 postcards or enough 3¢ stamps for 9 letters?

4. Barbara bought a bird book for 39¢. Can she give the clerk a quarter and a dime to pay for it, or will she need more money? If so, how much more?

5. Barbara has a piece of ribbon 30 inches long. Is this more or less than 2 feet and 8 inches? How much more or less?

6. Cookies cost 2¢ each, candy bars 6¢, and cupcakes 9¢. How much would it cost to buy 1 cupcake, 1 candy bar, and one cookie?

7. Judy had 20 cookies to sell. Sue bought 7, Tony bought 8, and Mary bought 4. How many did Judy have left after selling these to the 3 children?

8. Barbara sold some of her old picture books. How much did she receive in all if one sold for 8¢, one for 4¢, and one for 6¢?

9. Joe sold a top for 7¢, a ball for 3¢, and a gun for 19¢. How much did he get for selling these 3 toys?

10. Write 36 in tens and ones three different ways.

11. Do these exercises:

a.	b.	c.	d.	e.	f.	g.	h.
8	$.27	15	34	16	$.28	15	33
+ 15	− .19	+ 19	− 25	+ 9	− .17	+ 17	− 19

12. What does a quarter-past 4 o'clock mean?

Unit Test

1. Read this amount: $.35.

2. What does the mark (¢) mean when you are writing amounts of money?

3. What different coins make 16¢? How many tens are there in 16? How many ones?

4. How many tens are there in 35? in $.35? in 32¢?

5. Four children had sold different amounts of fudge. How could they find the amount that all four had sold?

6. Why is it important that Susan write her numbers in columns when she is adding (that is, to put the tens under tens and ones under ones)?

7. Mary, Sally, and Jean each have a certain amount of money. How can we find out how much money the three girls have altogether?

8. Jean is adding the money she had saved every day. Monday she saved 6¢, Tuesday 7¢, and Wednesday 9¢. Add Monday's savings to Tuesday's. Is your answer more than ten? Can you finish the problem?

9. Add, thinking tens and ones (check the answers):

a.	b.	c.	d.	e.	f.	g.
17	10	22	16	18	$.19	14
16	29	17	15	12	.18	12

10. Subtract by thinking tens and ones (check your answers by addition):

30	$.27	17¢	38	36	$.18	19
18	.19	13¢	12	20	.17	6

11. Draw a clock that shows the time to be a quarter to 3.

12. Draw a clock that shows 3:24.

UNIT 2

We Go Places and Do Things

The picture on Page 40 might be a street in your home town. Could that be you on your bike?

Somebody once said that we live in a fast moving world. What do you think? What is our world like? Think of all the different people whom we meet every day. There are the postmen, the grocers, the truck drivers, the people who work in our libraries, and many others who have a great deal to do with making our world what it is. What would we do if we had no one to drive our busses, to run our trains, or to pilot our airplanes?

Try to think of everyone who was of some help to you today. Do you suppose it would be possible to make a list of all the people who had something to do with making your life better on any one day of any week or month?

After you have thought carefully about some of these people and some of the places where you meet them, can you name one of them who does not need to know something about numbers?

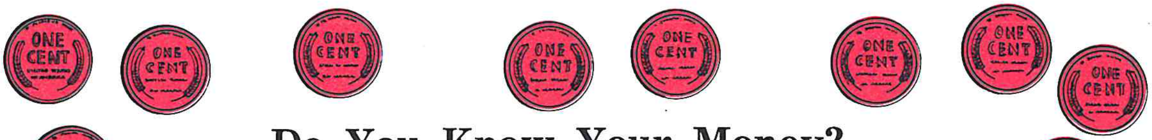
1. When you ride your bike on an errand, or just go for a ride, what use do you have for numbers?

2. Will the driver of the car who is traveling ahead of your father's car need to know anything about numbers? Tell several ways in which he might need to use them.

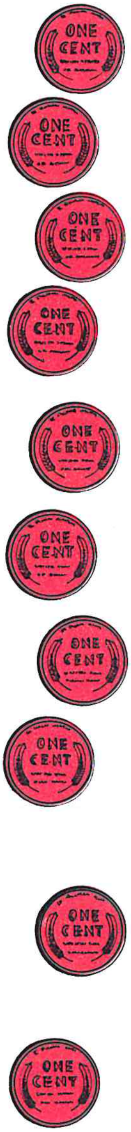
3. When you are shopping at a market, what do you and the clerk need to know about numbers?

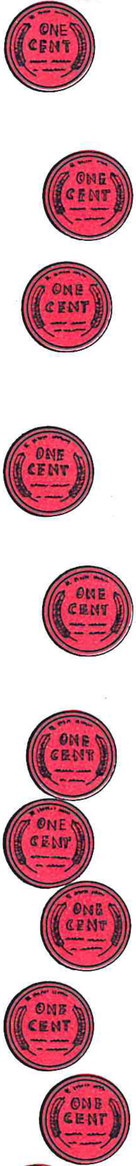
4. Who pays the paper boy at your house? Does this person need to know anything about numbers? What, for example?

5. Do you know your postman? Do you ever pay him "postage due"? What does that have to do with knowing numbers?



Do You Know Your Money?





1. See all the pennies on this page! Count them by ones. How many are there?

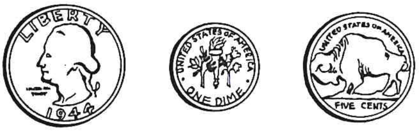
2. How much money is there altogether? Write this amount.

3. Count the pennies by twos. Did you get the same amount?

4. Now count the pennies in groups of three.

5. Why do you count by twos and threes sometimes instead of ones? Is the amount the same for all three ways of counting?

6. Look at these coins. Name each one of them.



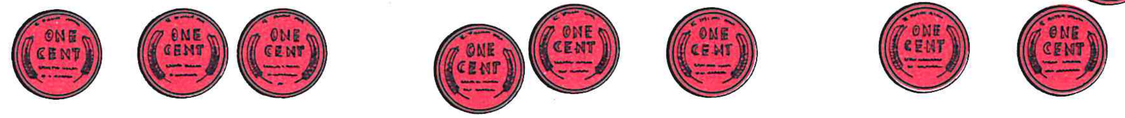
7. Could we use these coins in place of some pennies? How many pennies equal the same amount of money as a nickel? How many pennies would you get in change for a dime?

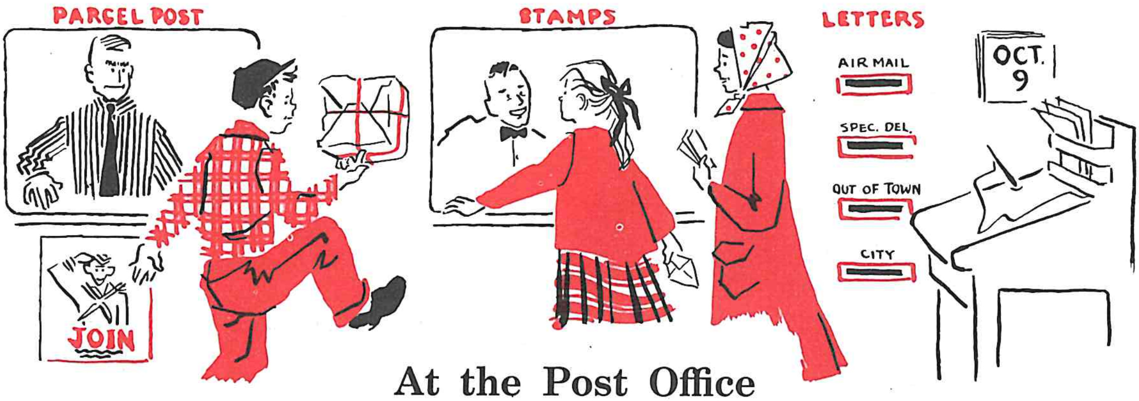
8. How many nickels equal the same amount of money as 20 pennies? How many dimes?

9. Did you see the quarter? How many pennies is it worth?

10. Let's see if we can use a quarter and a dime in place of all the pennies on this page. Do we need any other coin? If so, which one?

11. Draw a group of ten pairs of x's. Now draw two groups of 10 x's. Do ten groups of 2 things give you the same number as two groups of 10 things?





At the Post Office

What does the picture tell you that Ted and Jean are doing at the windows in the post office?

If Jean wants to buy stamps, must she know something about money?

The cost of sending the package is 22¢. Ted gives the clerk a quarter (25¢).

How will the clerk count Ted's change? How do most people count change?

When you count change, you first think of what you have spent, such as 22¢. Then you count on from that amount to the amount you gave the clerk.

Count together from 22¢ to the amount Ted gave the clerk, using pennies: 22¢, ?¢, ?¢, ?¢.

If you mail a package on which the postage is 16¢, and you give the clerk 25¢, see how much change you should receive. Use pennies: 16¢, ?¢, ?¢, ?¢, ?¢, ?¢, ?¢, ?¢, ?¢, ?¢.

Now see if you can use fewer coins in getting the same amount of change: 16¢, ?¢, ?¢, ?¢, ?¢, ?¢. What two kinds of coins did you use?

If it costs 9¢ to mail a package, and you give the clerk 25¢, count the change in pennies. Now use as few coins as possible to give the right amount of change: 9¢, ?¢, ?¢, ?¢. What coins did you use?

Counting Change

Alice Buys Stamps

Alice had a package to mail. The clerk weighed it and told Alice it would cost 34¢ postage.

The postman gave her 3 ten-cent stamps and 4 one-cent stamps. Alice put them on the package.

1. Tell how 3 ten-cent stamps and 4 one-cent stamps would cost 34¢.

2. What groups besides ones can you use to count things?

3. Look at the stamps on the package. Do the stamps have values like those of the figures of 34? Why?

4. Tell how the parts in this box give two of the meanings of thirty-four.

5. Why can we call the place of the 4 in 34 the ones place?

	30 ones 4 ones
3 tens	4 ones
3 tens and 4 ones = 34	

6. Why is the place of the 3 (on the left of the 4) the tens place?

7. Tell how each line in this table is equal to the other lines.

8. Which one of the lines would you use to divide 32 into 2 equal parts most easily?

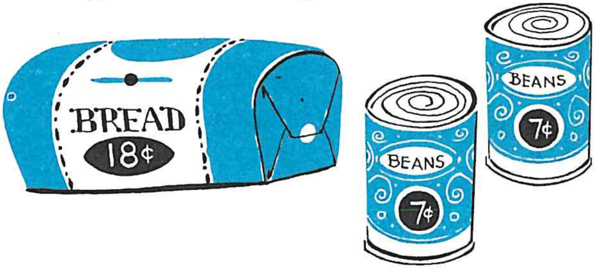
32	
3 tens	2 ones
2 tens	12 ones
1 ten	22 ones
	32 ones

9. Use counters to prove that 39 is the same as 3 tens and 9 ones. How many groups of ten ones do you have? How many ones are left over?

Seeing Groups of Ten — Place Values

The Corner Store

Mr. Sands runs the corner grocery store. Everyone likes him. He always says something nice to everyone so that they feel good.



1. Ted bought a loaf of bread and 2 cans of beans. How much money did he spend?

2. How much does Ted have left out of 35¢?

3. Jean bought 6 mints at 2¢ each. Draw a picture showing the things she bought. Would she have any money left from 25¢?

4. Tom went to the store for Mrs. White. He bought 3 tomatoes for 10¢, a bag of nuts for 14¢, and a bar of soap for 9¢. Find how much change Tom should receive from a quarter and a dime. How would you count Tom's change?

5. Add:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
32	25	16¢	$.18	24	17	23	16	19
18	19	15¢	.09	16	16	9	19	19

6. Subtract:

36	29	28	29	35	38	30	$.38	$.37
14	4	16	17	23	19	13	.25	.18

7. Tell how many tens and how many ones there are in these numbers:

36 = ? tens and ? ones
24 = ? tens and ? ones

12 = ? tens and ? ones
18 = ? tens and ? ones

8. How many dimes and pennies are there in 23¢?

Addition and Subtraction — Place Values

●●●●●●●●●●●● ●●●●●●●●●●●●

1 dozen 12 1 dozen 12

Thinking Straight

●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●

1. Count these dots by ones. Did you get 34? Are there 3 groups of ten and 4 ones?

2. Do you see that the number 34 tells you 3, and then 4? It doesn't say thirty-four; you have to think that. Why?

3. How can you think thirty-five when you see the number 35?

4. How many groups of 10 things must you count to reach 39 things?

5. What is the figure in tens place in the number 28? How many groups of 10 ones is this?

6. Make groups of 10 dots from these and then tell how many dots there are altogether:

●●●●●●●●● + ●●●●● + ●●●●●●● = ? dots.

7. How many groups of 10 are there in 7+7+7+7+7?

8. In 6 × 3, what figure goes in tens place when you change all the ones you can into groups of 10 ones?

9. How many groups of 10 can you find in the addition of 8 + 9 + 3?

10. Betty wants to treat her class. There are 39 children in the room. Would a package of 3 dozen cookies be enough if she wants every child to have a cookie? Why?

11. Do these by writing tens and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
16	25	11	13	38	31	17	34
+ 18	+ 14	+ 29	+ 19	− 29	− 20	− 8	− 19

Seeing Ones and Tens

What Have You Learned?

1. Mary's mother paid 24 cents for a package of tea. What is the greatest number of dimes in 24¢? the least number of pennies?

2. If Tom needs 30 cents for a baseball cap, will he need more than 2 dimes? Will he need any pennies?

3. Patsy bought 2 books at 19 cents each. How much did she spend for them?

4. Mother has $.16 to divide equally between Tom and Jane. How much will each child get?

5. Mary bought five 3-cent stamps. How much change should she get from 25 cents?

6. $.14 = ? dime and ? pennies.
7. $.26 = ? dimes and ? pennies.
8. $.35 = ? dimes and ? pennies.
9. $.22 = ? dimes and ? pennies.
10. 24 = ? tens and ? ones.
11. 19 = ? ten and ? ones.

12. A pencil costs 8¢. You give the clerk a quarter. How do you think the clerk would count your change?

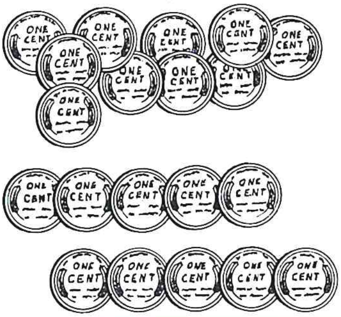
13. Father gave Jenny 30¢ so that she and her sister could each have a sandwich for their lunch at school. He gave her a quarter and a nickel. How can Jenny divide the money equally so both she and her sister can have their own lunch money? Jenny will have to get change, won't she? What kind of coins should she get, and how many?

14. Write this exercise, using tens and ones:

	Tens	Ones		Tens	Ones	
From this	▯ ▯ ▯ and	||||		?	?	
Take this away	▯ and	|||||	or	?	?	
				?	?	= ?

Pennies for Sunday School

Jean and Ted are ready for Sunday School. Their father gave them 10 pennies.



Ted is going to divide them equally. He counts, "One for you, and one for me, and one for you —" He keeps counting until the 10 pennies are equally divided. Count the pennies in each group. How many pennies are there in each of the two groups?

The facts about the two equal parts of 10 can be written in the following ways:

$10 \div 2 = 5$ $2 \times 5 = 10$ $2\overline{)10} = 5$

$$\begin{array}{r}5\\ \times 2\\ \hline 10\end{array}$$

Here are the two different ways to write the division about the 2 equal parts of 10: $2\overline{)10}$ $10 \div 2$

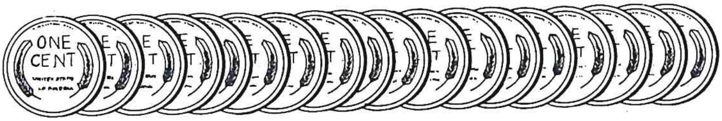
Count the pennies by twos. How many groups do you find?

Tell how you found these facts:

$5\overline{)10} = 2$ $5 \times 2 = 10$ five 2's = 10

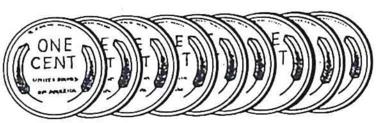
$$\begin{array}{r}2\\ \times 5\\ \hline 10\end{array}$$

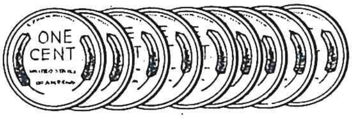
The twins, Barbara and Jim, are nine years old today. They have their pennies all ready to drop in the birthday box at Sunday School. They drop their pennies in, one at a time. How many pennies do they need altogether?



$$\begin{array}{r}9\\ \times 2\\ \hline\end{array} \qquad \begin{array}{r}9\\ +9\\ \hline\end{array}$$

Eighteen pennies can be divided into two equal groups:

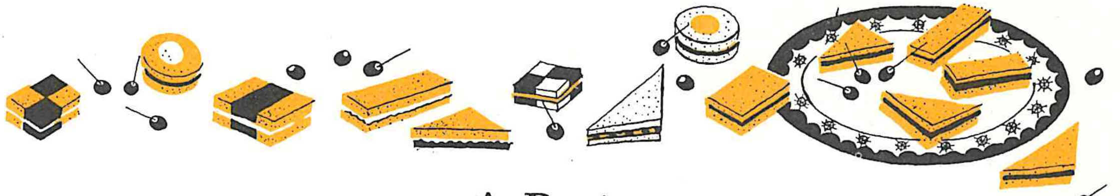


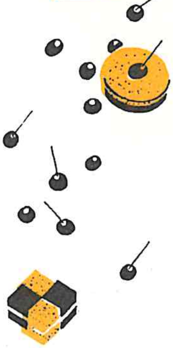


$$\begin{array}{r}?\\ 2\overline{)18}\end{array}$$

$18 \div 2 = ?$

$3\overline{)9} = ?$ $8 \div 2 = ?$ $4\overline{)8} = ?$ $6 \div 3 = ?$





A Party

Jean and Ted are going to have a party for all the children who live near them. They made 16 sandwiches. They wanted to know how many children could be served if each child were to get 2 sandwiches.

$$2 \text{ sandwiches} \overline{)16 \text{ sandwiches}}$$

Jean and Ted didn't know how to divide sandwiches this way, so each one figured it his own way.

Jean's figuring:

She put two sandwiches in each pile until all of the sandwiches were in piles.

She found that this took a long time.

Do this for Jean by using counters.

Ted's figuring:

He subtracted 2 each time until there were no numbers left.

Finish the work for Ted.

$$\begin{array}{r} 16 \\ -\ 2 \\ \hline 14 \\ -\ 2 \\ \hline 12 \\ -\ 2 \\ \hline 10 \end{array}$$

Would Ted and Jean find these number facts?

$\begin{array}{r} 8 \\ 2\overline{)16} \end{array}$ $8 \times 2 = 16$ eight 2's = 16 $\begin{array}{r} 2 \\ \times 8 \\ \hline 16 \end{array}$

Use counters to find these number facts:

$8\overline{)24}$ $? \times 8 = 24$? 8's = 24 $3\overline{)12}$ $? \times 3 = 12$? 3's = 12
$3\overline{)18}$ $? \times 3 = 18$? 3's = 18
$5\overline{)20} = ?$ $? \times 5 = 20$? 5's = 20

Some number facts that you should know:

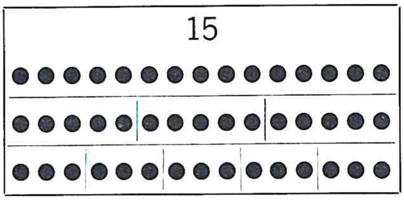
$2\overline{)16} = 8$ $8\overline{)24} = 3$ $3\overline{)12} = 4$ $3\overline{)18} = 6$ $5\overline{)20} = 4$
$8 \times 2 = 16$ $3 \times 8 = 24$ $4 \times 3 = 12$ $6 \times 3 = 18$ $4 \times 5 = 20$

Discovering Multiplication and Division Facts — Using Counters

Learning Facts about Numbers

Use these counters and find the facts for each grouping:

1.

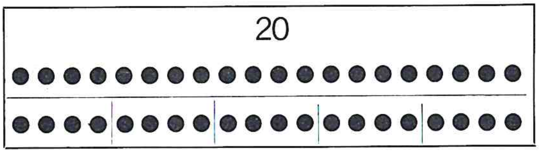


$3\overline{)15} = ?$ $\quad 3 \times ? = 15$

$5\overline{)15} = ?$ $\quad 5 \times ? = 15$

$$\begin{array}{r} ? \\ \times 3 \\ \hline 15 \end{array} \qquad \begin{array}{r} ? \\ \times 5 \\ \hline 15 \end{array}$$

2.

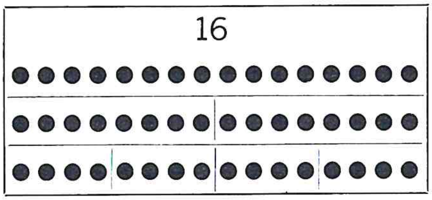


$4\overline{)20} = ?$

$5 \times ? = 20$

$$\begin{array}{r} ? \\ \times 5 \\ \hline 20 \end{array}$$

3.



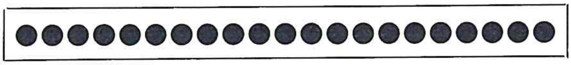
$?\overline{)16} = ?$ $\quad 2 \times ? = 16$

$?\overline{)16} = ?$ $\quad 4 \times ? = 16$

$$\begin{array}{r} ? \\ \times 2 \\ \hline 16 \end{array} \qquad \begin{array}{r} ? \\ \times 4 \\ \hline 16 \end{array}$$

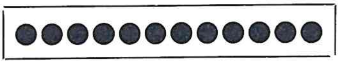
Count the groups of dots in the following exercises and then divide them into parts so that you can write both the division and multiplication facts:

4.



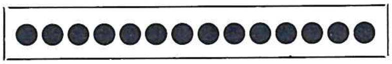
a. three equal parts **b.** seven equal parts

5.



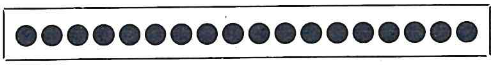
a. three equal parts
b. six equal parts
c. two equal parts

6.



a. two equal parts
b. seven equal parts

7.



a. two equal parts **b.** three equal parts **c.** nine equal parts

Buying Things in the Drug Store

Ted and two of his friends went to the drug store. They ordered ice cream cones. The clerk said, "Boys, you owe me 24¢."

How much was each boy's equal share?

$$\begin{array}{r} 8\text{¢} \\ 3\overline{)24} \end{array} \qquad \begin{array}{r} \text{Check} \\ 8\text{¢} \\ 8\text{¢} \\ +\,8\text{¢} \\ \hline 24\text{¢} \end{array} \qquad \begin{array}{r} \text{Check} \\ 8\text{¢} \\ \times\,3 \\ \hline 24\text{¢} \end{array}$$

You can see that adding and multiplying the 8's puts the three equal parts of 24 back together. When we multiply we are finding how many three 8's are. We can multiply only when the parts (such as 8¢) are all the same.

Multiplication and division are related. If we know that $3 \times 8 = 24$, then we know that $3\overline{)24} = 8$. If we know that $3\overline{)24} = 8$, then we know that $3 \times 8 = 24$.

In multiplying, we say "times," which means we take a number that many times. Three times 7 means we take 7 three times. Does $7 + 7 + 7 = 21$? Then,

$$3 \times 7 = \ ? \quad \text{and } 3\overline{)21} = \ ?$$

Do these problems both by adding and multiplying. Give a division fact which each multiplication fact tells you is true.

1. Bill saw a candy bar for 5¢. He bought one for himself and one for each of his two friends. What did the candy bars cost him?

2. Steve bought a package of gumdrops. He gave 4 to each of his 5 friends. How many did he give away?

Relation of Multiplication and Division Facts

Ted and Jean Plant Tulip Bulbs

Tulips are Jean's favorite flower. She knows that if she does not plant the tulip bulbs in the fall, she will not have tulips in the spring.

Ted likes to garden. He said he would help Jean plant the tulip bulbs. Ted read that tulip bulbs must be planted 12 inches apart. They measured their garden and found that it was large enough for 3 rows with 12 bulbs in each.

Now they must know how many bulbs they should buy. Ted said, "We can add 12 three times."

$$\begin{array}{r} 12 \\ 12 \\ +\ 12 \\ \hline \end{array}$$

Jean said, "Why don't we multiply? That's shorter."

This is how she explained it to Ted:

$$\begin{array}{r} 12 \\ \times 3 \\ \hline 36 \end{array} = \begin{array}{r} \text{1 ten and 2 ones} \\ \times 3 \\ \hline \text{3 tens and 6 ones} \end{array}$$

"I have 1 ten and 2 ones that I am going to multiply by 3. 3 × 2 ones = 6 ones.

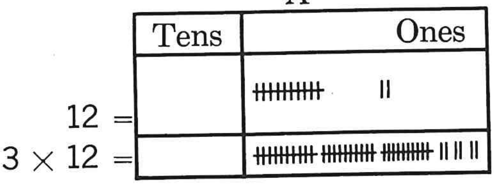
Now I will multiply my tens. 3 × 1 ten = 3 tens. 3 tens and 6 ones are 36."

1. Add 12 three times and see if Ted would get the same answer as Jean. Which way is shorter?

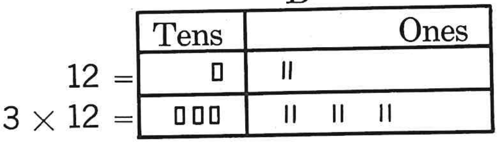
2. Use counters in Box A to see if Jean's work is correct. Do three 10's = 30?

3. Would Box B be more like the way Jean did her figuring? Why?

A



B



4. Multiply by writing tens and ones:

a.	b.	c.	d.	e.	f.	g.	h.
11	14	13	12	11	13	12	10
× 5	× 2	× 3	× 4	× 3	× 2	× 2	× 3

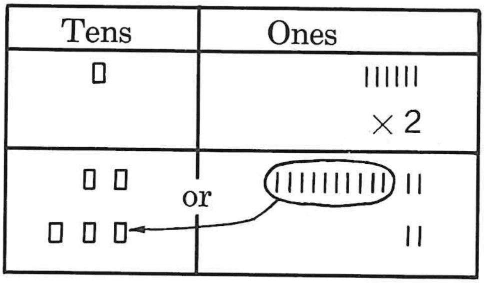
Alice Plants Daffodil Bulbs

Alice likes daffodils more than any other flower. She is going to plant two long rows of them in front of the porch. She wants 16 bulbs in each row. How many bulbs should she buy?

$$\begin{array}{r} 16 \\ +\,16 \\ \hline 32 \end{array} = \begin{array}{r} 1 \text{ ten and } 6 \text{ ones} \\ +\,1 \text{ ten and } 6 \text{ ones} \\ \hline 2 \text{ tens and } 12 \text{ ones} \\ \text{or} \\ 3 \text{ tens and } 2 \text{ ones} \end{array}$$

How many tens can you make from 12 ones? Add this ten to the other tens. How many tens and how many ones do you have?

Alice can multiply to get the answer:



= 32

$$\begin{array}{r} 16 \\ \times\,2 \\ \hline \end{array} = \begin{array}{r} 1 \text{ ten and } 6 \text{ ones} \\ \times\,2 \\ \hline 2 \text{ tens and } 12 \text{ ones} \\ \text{or} \\ 3 \text{ tens and } 2 \text{ ones} \end{array}$$

Again, she gets 1 ten and 2 ones from the 12 ones. She puts the 1 ten with the 2 tens, giving her 3 tens and 2 ones, or 32.

Do you understand this multiplication?

$$\begin{array}{r} 18 \\ \times\,2 \\ \hline \end{array} = \begin{array}{r} 1 \text{ ten and } 8 \text{ ones} \\ \times\,2 \\ \hline 2 \text{ tens and } 16 \text{ ones} \end{array} = 3 \text{ tens and } 6 \text{ ones} = 36$$

Why?

1. $\begin{array}{r} 1 \text{ ten and } 9 \text{ ones} \\ \times\;2 \\ \hline ? \text{ tens and } ? \text{ ones} \end{array} = \;?$

2. $\begin{array}{r} 2 \text{ tens and } 5 \text{ ones} \\ \times\,2 \\ \hline ? \text{ tens and } ? \text{ ones} \end{array} = \;?$

Multiplication — Using Tens and Ones

Having a Get-Together Party

Jane was glad to be in school. It was such fun to see all her friends every day. "I will have a party and invite the girls in my class," she said to her mother.

Jane made 24 cookies. She wants to divide them into equal groups. There are 8 girls in all. How many cookies will each girl have?

$\boxed{8\overline{)24} = \ ?}$

Divide 24 into 8 equal parts. Use your counters to find the answer if you don't know the division fact.

$$\begin{array}{r} 3 \\ 8\overline{)24} \\ \underline{24} \end{array}$$

24 is 2 tens and 4 ones or 24 ones. You must use ones. Why? Each girl can have 3 cookies. You write the 3 over the 4 in the ones place to show that you are working with ones. You write 24 under 24 to show that you have used all 24 cookies.

Jane has 16 pieces of candy. How many pieces can each girl have?

$\boxed{8\overline{)16} = \ ?}$

$$\begin{array}{r} 2 \\ 8\overline{)16} \\ \underline{16} \end{array}$$

Write 2 over the 6 in ones place. Why? Write 16 under 16. Why?

1. Find how many there are in each of the equal parts in these problems:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
$6\overline{)18}$	$7\overline{)21}$	$3\overline{)18}$	$4\overline{)20}$	$5\overline{)20}$	$2\overline{)12}$

Division — Finding the Size of a Part

Things to Do

1. Divide these into two equal parts:

a. ●●●●●●●●●●●● **b.** ●●●●●●●●●●

2. Multiply:

a.

Tens	Ones
▯	||||||
	× 2

= ?

b.

Tens	Ones
▯	|||||
	× 2

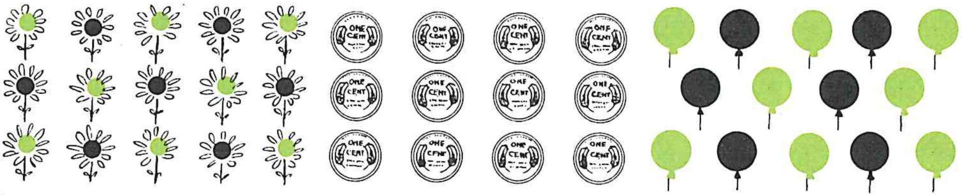
= ?

3. Multiply:

a. 1 ten and 6 ones
× 2
? tens and ? ones = ?

b. 1 ten and 5 ones
× 2
? tens and ? ones = ?

4. How many more than 10 things are there in each of these pictures? How many in all?



5. Use counters to find equal parts:

a.	b.	c.	d.	e.	f.
$3\overline{)24}$	$5\overline{)20}$	$4\overline{)16}$	$8\overline{)16}$	$9\overline{)18}$	$3\overline{)12}$

6. Divide one dozen apples equally among 4 children. How many apples will each child receive?

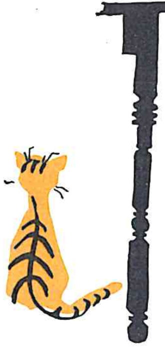
7. You have done all these in class work. See how many of them you know at once. Write the answers:

$8\overline{)16}$	$9\overline{)18}$	$4\overline{)24}$	$5\overline{)25}$	$4\overline{)28}$	$7\overline{)28}$
$3\overline{)27}$	$7\overline{)14}$	$2\overline{)12}$	$3\overline{)27}$	$3\overline{)18}$	$2\overline{)14}$

8. Write the multiplication fact for each exercise above.

Jean Gets Ready for Halloween

Jean knows that a group of her friends is going to stop at her home for "Tricks or Treats." She is going to get the treats ready. What is Jean going to put in the cups for a treat?



Jean counts the corn candy and finds that there are 32 pieces in all. How many pieces can she put in each cup to have 8 equal parts?

Let's count out 8 pieces and put 1 in each of the 8 cups, like this:

Every time we count out 8 pieces, we have added another piece to each cup.

How many times do you have to count out groups of 8 to find how many 8's there are in 32?

We can find the answer to Jean's problem by counting the number of times 8 can be subtracted. Do this:

$$\begin{array}{r} 32 \\ -\ 8 \\ \hline 24 \\ -\ 8 \\ \hline ? \end{array}$$

How many pieces will there be in each paper cup?

$$8\overline{)32}^{\;4} \qquad \begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$$

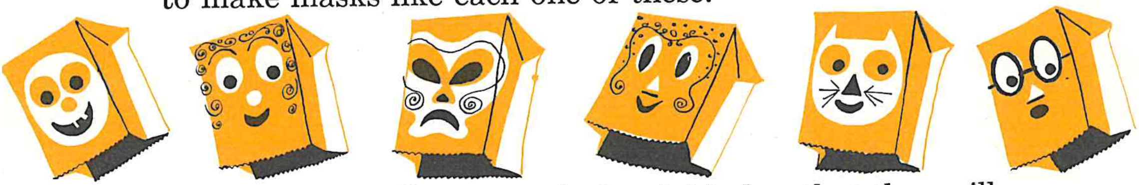
1. Find how many 6's there are in 18. 9's in 27.

Size of a Part Found by Counting

Steve and Jerry Give a Halloween Party

Steve and Jerry are going to have a Halloween Party in the old barn near town. They are going to have a real scary party with ghosts and witches and bats.

1. Steve and Jerry are making masks out of paper sacks for the boys and girls to wear at the party. They decided to make masks like each one of these.



How many will they need of each kind so that they will have enough for 24 children?

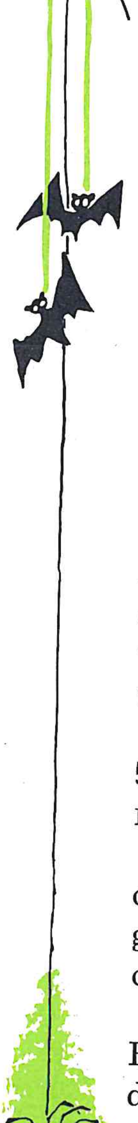
2. Jerry makes 6 paper bats every night. How many nights will he have to work to make 18 paper bats?

3. Six children can get around a tub at the same time to bob for apples. How many tubs will they need so that all 24 children can bob for apples at the same time?

4. Steve and Jerry are going to have tiny paper pumpkins as prizes. They plan to put corn candy in the pumpkins. Each pumpkin can hold 4 pieces. How many pieces will they need for 8 pumpkins?

5. Corn candy costs 24¢ a pound. Find how much 2 pounds will cost the boys.

6. Steve thinks they should put jack-o'-lanterns in all of the barn windows. There are 7 windows. The boys have 21 cardboard jack-o'-lanterns in which they plan to put flashlights. Draw a picture of 7 barn windows and show how many jack-o'-lanterns you think should be put in each window.



7. Jerry says he will make a dungeon for the witch. He wants it to be large enough for the witch and her large kettle. He decides to use a horse stall, but he needs to close one end of it. He measured the end of the stall and found that he needed to use 21 boards of the size that his father had stored in the garage. How many trips will he have to make if he can carry 7 of the boards each time?

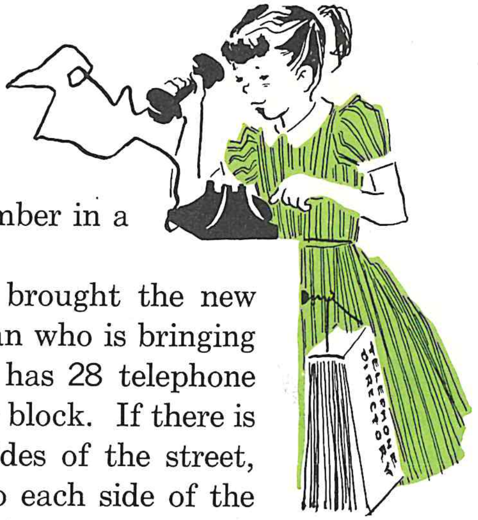
8. The boys are fixing a pulley at the barn door. When anyone comes in the door, a large spider will drop in front of them. They need 20 yards of line to make the spider web. Steve's spool of fishing line was 50 yards long. If they use what they need, how many yards will be left?

9. At last everything was ready for the party. "It is 5:15 P.M. now," said Steve. "The party begins at 5:30 P.M. We have only ? minutes to wait."

10. Everyone was so excited that some of the children came a little early. Seven children came in the first group. Then 6 more came. In a few minutes 3 more children came. How many children came early?

11. All of the 24 children were dressed in costumes. Eighteen were dressed like ghosts. How many were dressed in other costumes?

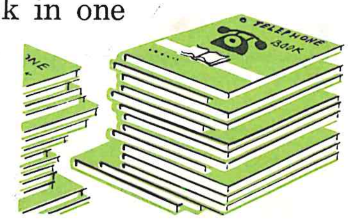
Ann's New Telephone



Ann has a new dial telephone.
Do you ever use the telephone?
Have you looked for a telephone number in a telephone book?

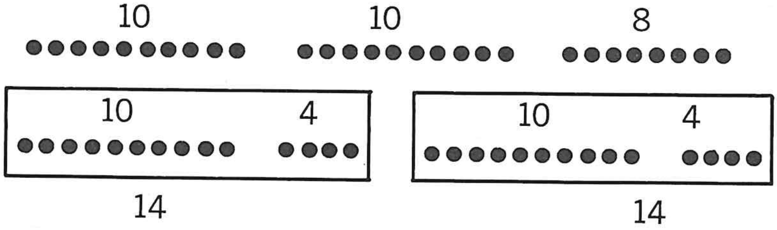
Have you been home when a man brought the new telephone book to your house? The man who is bringing Ann's family the new telephone book has 28 telephone books to give to the people living in her block. If there is an equal number of houses on both sides of the street, how many books will the man bring to each side of the street?

If he wants to divide the 28 telephone books into 2 equal groups, he might begin by putting a book in one pile and another book in a second pile, one in the first and another in the second, until he had used the whole 28. Then he could count the books in each pile and find that there were 14.



$2\overline{)28} = 14$ Why?

He could count them faster if he had them in groups of 10. Then he could do this:



1. Use counters to show the 2 equal parts in 24 ones.

2. Divide 39 into 3 equal parts. Use 39 counters in groups of 10 ones and single ones.

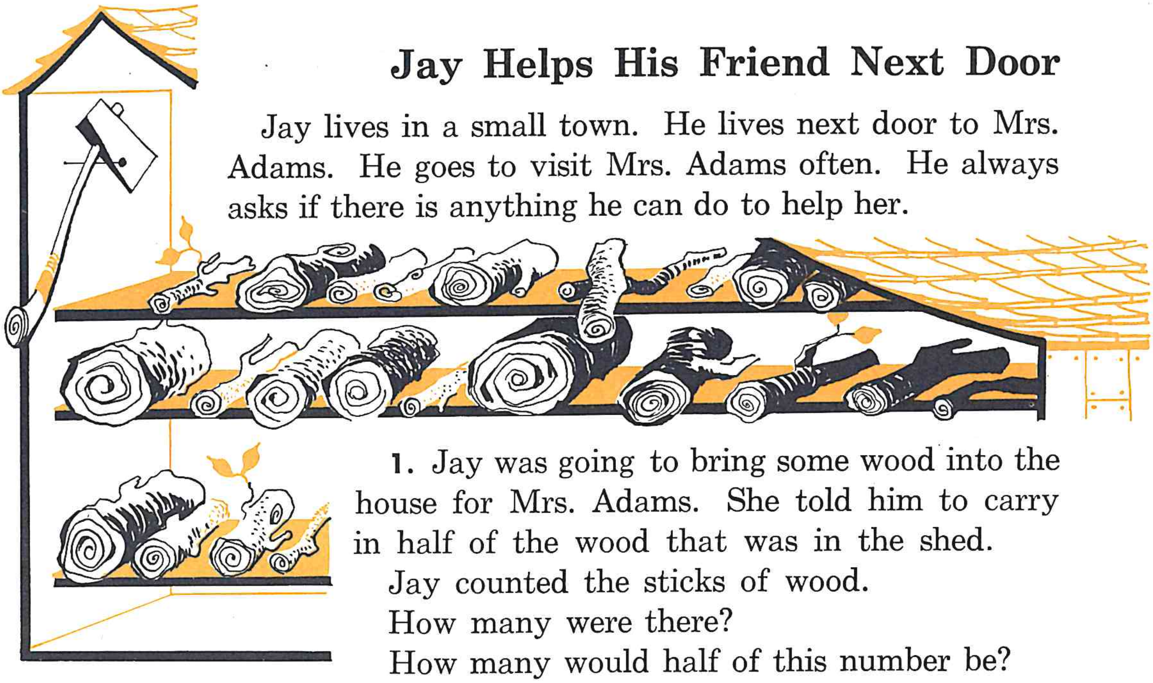
3. Divide these 26 dots into 2 equal parts:

●●●●●●●●●● ●●●●●●●●●● ●●●●●●

Two Equal Parts — Using Groups of 10 Ones and Single Ones

Jay Helps His Friend Next Door

Jay lives in a small town. He lives next door to Mrs. Adams. He goes to visit Mrs. Adams often. He always asks if there is anything he can do to help her.



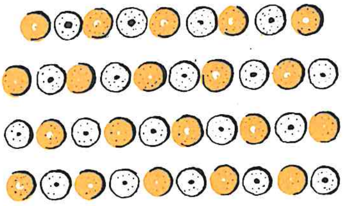
1. Jay was going to bring some wood into the house for Mrs. Adams. She told him to carry in half of the wood that was in the shed.

Jay counted the sticks of wood.

How many were there?

How many would half of this number be?

Can you find the answer by using two groups of 10 and a group of 4? Tell how.



2. Mrs. Adams asked Jay to take these cookies to three of her friends who are sick. How many groups of 10 cookies will each friend get? How many single cookies besides?

What will be each friend's share?

3. One day Jay had 36 flowers to take to 3 of Mrs. Adams' friends. How many flowers will each of the friends receive? Show with pictures how you would find the answer.

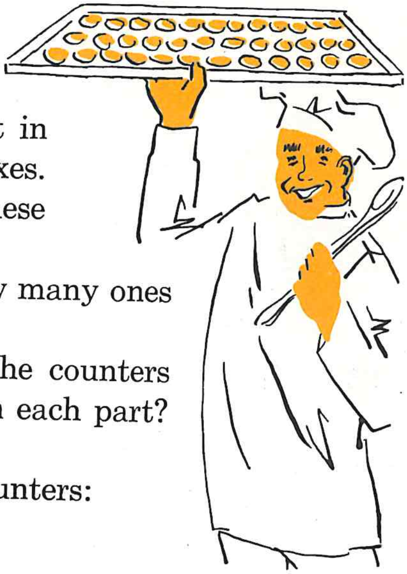
4. Jay and Mrs. Adams have a game they sometimes play. They use bundles of 10 counters and 9 single counters and make up problems like this: 2)ǂǂǂǂǂǂǂǂǂǂ ǂǂǂǂǂǂǂǂǂǂ IIII = ǂǂǂǂǂǂǂǂǂǂ II = 12

Play the game with them, using these problems and your own bundles of 10 ones and single ones:

a. 3)ǂǂǂǂǂǂǂǂǂǂ ǂǂǂǂǂǂǂǂǂǂ ǂǂǂǂǂǂǂǂǂǂ IIIIIIIII = ?   **b.** 2)ǂǂǂǂǂǂǂǂǂǂ ǂǂǂǂǂǂǂǂǂǂ IIIIII = ?

Division — Using Groups of 10 Ones and Single Ones

Baker Bill



Baker Bill makes sugar cookies that melt in your mouth. He is putting cookies in boxes. Count the cookies on his tray. He will put these into 3 boxes.

How many groups of ten are there and how many ones are left over?

Use a counter for each cookie. Divide the counters into 3 equal parts. How many do you get in each part? Did you get a dozen in each part?

Do this division by using tens and ones counters:

$$3\overline{)36} = 3\overline{)\ \square\square\square\ ||||||\ } = \ ?$$

Dividing these into 3 equal parts, we have: □|| □|| □||
This gives 1 tens counter and 2 ones counters in each part.

Do the counters in each part stand for the number 12?

This division can be done by writing tens and ones:

Dividing

$$
\begin{array}{r}
\text{1 ten and 2 ones} = 12\\
3\overline{)36} = 3\overline{)\text{3 tens and 6 ones}}\\
\underline{\text{3 tens}\qquad\qquad\qquad}\\
\text{6 ones}\\
\underline{\text{6 ones}}
\end{array}
$$

Checking by addition

$$
\begin{array}{rr}
\text{1 ten and 2 ones} & 12\\
\text{1 ten and 2 ones} & 12\\
+\ \underline{\text{1 ten and 2 ones}} & +\ \underline{12}\\
\text{3 tens and 6 ones} & 36
\end{array}
$$

Checking by subtraction

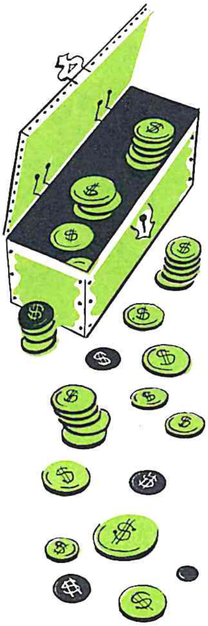
$$
\begin{array}{rr}
\text{3 tens and 6 ones} & 36\\
\underline{-\ \text{1 ten and 2 ones}} & \underline{-\ 12}\\
\text{2 tens and 4 ones} & 24\\
\underline{-\ \text{1 ten and 2 ones}} & \underline{-\ 12}\\
\text{1 ten and 2 ones} & 12\\
\underline{-\ \text{1 ten and 2 ones}} & \underline{-\ 12}
\end{array}
$$

Checking by multiplication

$$
\begin{array}{rr}
\text{1 ten and 2 ones} & 12\\
\underline{\times 3} & \underline{\times 3}\\
\text{3 tens and 6 ones} & 36
\end{array}
$$

Division — Writing Tens and Ones

Treasure Chest



Cindy and Charles live next door to Ann. They are much younger than Ann, but they like her very much. They follow her wherever she goes and try to do things just as she does.

Ann found a cheese box that would be just right for a treasure chest for the children. She saw some chocolate candy downtown that was wrapped in gold paper to make the pieces look like gold coins. Ann is going to fill the treasure chest with them.

Ann bought a pound of this candy. She counted the pieces and found that she had 36 pieces. She could fill 2 boxes and then Cindy and Charles could each have a treasure chest.

Ann wants to divide the 36 pieces into 2 equal parts.

$2\overline{)36} =$? How could you do the division?

$2\overline{)36} = 2\overline{)\text{卌卌 卌卌 卌卌 ||||||}}$ or $2\overline{)\text{▯ ▯ ▯ ||||||}}$

Could she do this?

$$2\overline{)36} = 2\overline{)\text{▯ ▯ ▯ ||||||}} = \begin{array}{r} \text{▯ \quad ||||||||} \\ 2\overline{)\text{▯▯ \quad ||||||||||||||||}} \end{array}$$

Check: Adding

$$\begin{array}{r} 18 \\ +\,18 \\ \hline ? \end{array}$$

Multiplying

$$\begin{array}{r} \text{1 ten and 8 ones} \\ \times 2 \\ \hline \text{? tens and ? ones} \end{array}$$

Try tens and ones in the division:

$$2\overline{)36} = 2\overline{)\text{3 tens and 6 ones}} = \begin{array}{r} \text{1 ten and 8 ones} = 18 \\ 2\overline{)\text{2 tens and 16 ones}} \\ \underline{\text{2 tens}\qquad\qquad\quad} \\ \text{16 ones} \\ \underline{\text{16 ones}} \end{array}$$

Why did you use 36 as 2 tens and 16 ones?

Reviewing Some Multiplication and Division Facts

These are the combinations which you have been meeting in the last few pages. See if you know the fact that comes from each one of them:

	a.	b.	c. 2	d. 2	e. 2	f.	g.	h.
1.	3 × 2 6	2 × 4 8	3)6	2)4	4)8	2 × 3 6	1 × 5 5	5 × 1 5
2.	7)14	6)12	5 × 2	3 × 3	2)12	2)8	3)9	5)10
3.	3)15	2 × 7	3 × 4	2 × 6	4)12	2)14	3)12	2)10
4.	2)16	5)15	7 × 2	4 × 3	3 × 5	4 × 2	6 × 2	2 × 5
5.	3 × 6	4)16	2)18	2 × 8	6)18	8 × 2	5 × 3	9)18
6.	4)28	7)21	5 × 4	2 × 9	3)18	4 × 4	8)16	4 × 5
7.	8 × 3	3)27	4 × 6	3 × 7	9 × 2	6 × 3	4)20	9)27
8.	5 × 5	4 × 7	3)24	4)24	5)20	9 × 3	8)24	7 × 3
9.	3 × 9	7 × 4	5)25	3 × 8	6)24	3)21	6 × 4	7)28

A Halloween Treat

Cindy and Charles were so happy with their treasure chests that Ann decided to make a Halloween treat for them. She bought these paper pumpkins for 5¢ each. She is going to fill them with candy pumpkins.

It takes 16 pieces to fill one of them. How many pieces does she need for both pumpkins?

She can add:

$$\begin{array}{r} 16 \\ +\,16 \\ \hline 32 \end{array}$$

How many tens are there in 12 ones?

She can multiply:

$$\begin{array}{r} 1 \text{ ten and } 6 \text{ ones} \\ \times\,2 \\ \hline 2 \text{ tens and } 12 \text{ ones} \end{array} \quad \text{or} \quad \begin{array}{r} 16 \\ \times\,2 \\ \hline 32 \end{array}$$

Why?

$$\begin{array}{r} 16 \\ \times\,2 \\ \hline 12 \\ 20 \\ \hline 32 \end{array}$$

Could she multiply by thinking like this? Multiply the ones. 2 × 6 ones = 12 ones. Do 12 ones = 1 ten and 2 ones? Prove it by using counters. Multiply the tens. 2 × 1 ten (10) = 20. Does 20 = 2 tens?

$$\begin{array}{r} 16 \\ \times\,2 \\ \hline 32 \end{array}$$

Could she do this? 2 × 6 ones = 12 ones. Write the 2 ones in ones place in the answer and hold the 1 ten. 2 × 1 ten = 2 tens. 2 tens + 1 ten (held) = 3 tens. Write 3 in tens place in the answer.

1. Multiply, writing out the tens and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
12	11	16	13	16	15	12	11	10
×2	×3	×2	×1	×1	×1	×3	×4	×3
24	33	32	13	16	15	36	44	30

2. Think tens and ones. Finish these exercises:

14	12	13	15	12	17	19	18	13
×3	×2	×4	×2	×3	×2	×2	×2	×5
42	24	52	30	36	34	38	36	65

Division—Thinking Tens and Ones

1. Divide 28 into two equal parts:

$$\begin{array}{r} 1 \\ 2\overline{)28} \\ \underline{2} \\ 8 \end{array}$$

We think: 28 is 2 tens and 8 ones.

2 tens divided into two equal parts gives 1 ten in each part. Write 2 under the 2 in 28 to show that you have used the 2 tens. Write 1 ten in the answer over the 2 tens. (This is tens place.)

$$\begin{array}{r} 14 \\ 2\overline{)28} \\ \underline{2} \\ 8 \\ \underline{8} \end{array}$$

Draw a line and write 8 ones under it. They have not been divided.

8 ones divided into two equal parts gives 4 ones in each part. Write 8 under the 8 ones to show that they have been used. Write 4 in ones place in the answer.

The answer is 14.

Tell why we can use three different ways to prove a division answer:

By addition

$$\begin{array}{r} 14 \\ 2\overline{)28} \\ \underline{2} \\ 8 \\ \underline{8} \end{array} \qquad \begin{array}{r} 14 \\ +\underline{14} \\ 28 \end{array}$$

By subtraction

$$\begin{array}{r} 28 \\ -\underline{14} \\ 14 \\ -\underline{14} \\ 0 \end{array}$$

By multiplication

$$\begin{array}{r} 14 \\ \times\underline{2} \\ 8 \\ \underline{20} \\ 28 \end{array} \quad \text{or} \quad \begin{array}{r} 14 \\ \times\underline{2} \\ 28 \end{array}$$

2. Jim has a piece of board 39 inches long. He wants to divide it into 3 equal parts. How long will each part be? Check your answer by multiplication.

3. John's uncle drove his car to the next town and back again each day for 3 days. He found that he had gone 36 miles in all. How far is it to the next town and back again?

4. Divide:

a. $2\overline{)24}$

b. $2\overline{)22}$

c. $2\overline{)26}$

d. $3\overline{)36}$

e. $3\overline{)33}$

f. $3\overline{)39}$

Invitations to a Party

Ted and Jean had 36 invitations to write for their party. Ted and Jean are going to write an equal number of them. They divided $2\overline{)36}$ to find how many invitations each one must write.

$$2\overline{)36} \;=\; 2\overline{)3\text{ tens and }6\text{ ones}} \;=\; \begin{array}{l} \quad 1\text{ ten and }\ 8\text{ ones} = 18 \\ 2\overline{)2\text{ tens and }16\text{ ones}} \end{array}$$

Their mother divided 36 into 2 equal parts, also. She knew that 3 tens could not be divided into 2 equal parts and give tens, but she knew 2 tens could. So she first divided the 2 tens.

$$\begin{array}{r} 1 \\ 2\overline{)36} \\ \underline{2} \\ 1 \end{array}$$

Step 1: The 2 under the 3 in tens place shows that she used 2 tens out of the 3 tens. She had 1 ten that was not used.

The 1 in tens place in the answer shows that she divided the 2 tens by 2: 2 tens ÷ 2 = 1 ten in each of the 2 equal parts.

$$\begin{array}{r} 18 \\ 2\overline{)36} \\ \underline{2} \\ 16 \\ \underline{16} \end{array}$$

Step 2: There were 1 ten and 6 ones yet to be divided. These gave her 16 ones. She put 16 ones under the 16 ones to show that she had used all of them. She also wrote 8 in ones place in the answer to show that she had divided 16 ones into 2 equal parts. There are 8 in each part. The answer is 18. Each child will write 18 invitations.

1. Divide and check, thinking tens and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
$2\overline{)22}$	$2\overline{)26}$	$2\overline{)24}$	$2\overline{)32}$	$2\overline{)34}$	$2\overline{)38}$
$3\overline{)33}$	$2\overline{)30}$	$3\overline{)39}$	$4\overline{)52}$	$2\overline{)36}$	$3\overline{)45}$

Jean Makes Sugar Cookies

Twenty-eight children said they could come to the party. Jean is going to make large sugar cookies for them to eat. She can put 7 cookies on each cookie pan. How many pans must she fill to have 28 cookies?

$$7\overline{)28}$$

$$\begin{array}{r} 28 \\ -\ 14 \\ \hline 14 \end{array}$$

Jean doesn't know how many 7's there are in 28. She does know that there are two 7's in 14. She knows that to find the other part of 28, she can subtract 14 from 28. She found that 14 and 14 are parts of 28.

$$\overset{2\ +\ 2}{7\overline{)14 + 14}}$$

There are two 7's in 14 and two 7's in the other 14, so there are four 7's in 28.

Jean must fill 4 pans.

Subtract to find the other part; then finish dividing:

1. $4\overline{)24} = 4\overline{)12 + 12\,?}$

2. $7\overline{)21} = 7\overline{)14 + \quad ?}$

3. $3\overline{)21} = 3\overline{)12 + 9\,?}$

4. $4\overline{)16} = 4\overline{)8 + \quad ?}$

5. $4\overline{)28} = 4\overline{)12 + \quad ?}$

6. $6\overline{)24} = 6\overline{)12 + \quad ?}$

These are the parts Ted used in dividing. Finish the work for him:

7. $3\overline{)27} = 3\overline{)15 + 12}$

8. $5\overline{)25} = 5\overline{)10 + 10 + 5}$

9. $4\overline{)20} = 4\overline{)8 + 8 + 4}$

10. $2\overline{)18} = 2\overline{)8 + 10}$

Find parts and divide:

	a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**
11.	$\overset{7}{2\overline{)14}}$	$\overset{6}{5\overline{)30}}$	$\overset{4}{5\overline{)20}}$	$\overset{3}{6\overline{)18}}$	$\overset{3}{5\overline{)15}}$	$\overset{8}{3\overline{)24}}$	$\overset{7}{4\overline{)28}}$

Using Parts of a Number to Divide

The Number 30

Ann is making paper doll dresses for her friend. She has made 30 dresses in all. There are 5 sun dresses, 5 party dresses, 5 school dresses, and 15 of other kinds of dresses. Ann wants to put 5 dresses in each drawer of a little chest. She wants to know if there are enough drawers so that she can put 5 dresses in each one. She wants to divide $5\overline{)30}$. She knows these things about the number 30:

$30 = 30$ ones
$30 = 3$ tens and 0 ones
$30 = 2$ tens and 10 ones
$30 = 1$ ten and 20 ones

$30 = 10 + 10 + 10$

$$\begin{array}{r} 10 \\ \times\, 3 \\ \hline 30 \end{array} \qquad 2\overline{)30} = 15 \qquad \begin{array}{r} 15 \\ \times\, 2 \\ \hline 30 \end{array}$$

Could Ann use this?

$5\overline{)30} = 5\overline{)10 + 10 + 10}$

How many 5's are there in 10?
How many 5's in three 10's?

Could Ann use this?

$5\overline{)30} = 5\overline{)15 + 15}$

How many 5's in 15?
How many 5's in two 15's?

She can find how many 5's in 30 by using subtraction. Will you do this for her? How many times did she subtract? Do you now know that $5\overline{)30} = 6$, or six 5's $= 30$?

$$\begin{array}{r} 5 \\ \times\, 6 \\ \hline 30 \end{array}$$

There are 6 drawers in the chest, so Ann can put 5 dresses in each drawer.

You can use the fact that $30 = 24 + 6$ to find how many 6's there are in 30:

$$6\overline{)30} = ? \qquad 6\overline{)30} = 6\overline{)\overset{? \,+\, ?\, =\ \ ?}{24 + 6}}$$

$$6\overline{)30} = 5 \qquad \begin{array}{r} 6 \\ \times\, 5 \\ \hline 30 \end{array} \qquad \text{Five 6's} = 30$$

Facts to remember:

$6 \times 5 = 30$ $\quad 5 \times 6 = 30$ $\quad 3 \times 10 = 30$ $\quad 5\overline{)30} = 6$ $\quad 3\overline{)30} = 10$
Six 5's $= 30$ $\quad$ Five 6's $= 30$ $\quad$ Three 10's $= 30$ $\quad 6\overline{)30} = 5$

Facts in 30

Facts in Numbers 32, 35, and 36

1. See what you can find out about 32. If you divide by 2, $2\overline{)32} = 2\overline{)2\text{ tens} + 12\text{ ones}} = 16$. Why? Then you could write this from what you know:

$$\begin{array}{c}32\\\hline 16+16\\\hline 8+8+8+8\end{array}$$

What equal parts in 32 did you find first? How many are there in each of the four equal parts?

$$4\overline{)32} = 8 \qquad 4 \times 8 = 32 \qquad \begin{array}{r}8\\\times 4\\\hline 32\end{array}$$

Using what you know about the four 8's in 32, tell why:

$$8\overline{)32} = 4 \qquad 8 \times 4 = 32 \text{ or } \begin{array}{r}4\\\times 8\\\hline 32\end{array}$$

2. You can use the same way that was used with 32 to find some multiplication and division facts about 36:

$2\overline{)36} = \ ?$

$$4\overline{)36} = \ ? \qquad \begin{array}{r}?\\\times 4\\\hline 36\end{array} \qquad 9\overline{)36} = \ ? \qquad \begin{array}{r}?\\\times 9\\\hline 36\end{array} \qquad 6\overline{)36} = \ ? \qquad \begin{array}{r}?\\\times 6\\\hline 36\end{array}$$

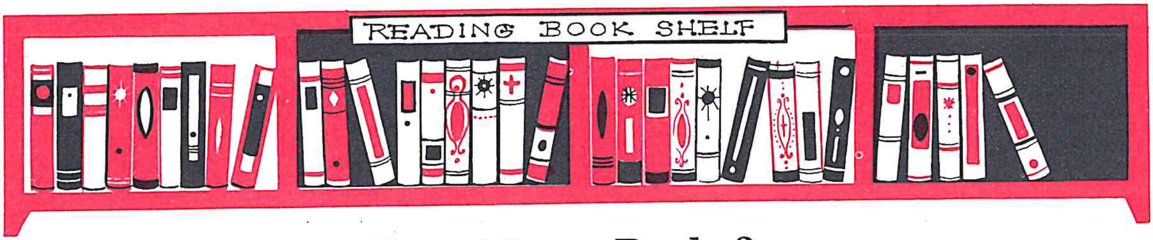
3. Find the facts in 35:

35 = 3 tens and 5 ones = 30 ones + 5 ones. Why?
35 = 2 tens and 15 ones = 20 ones + 15 ones. Why?
35 = 1 ten and 25 ones = 10 ones + 25 ones. Why?

a. Do you see that any one of the parts written as ones can be divided by 5? $5\overline{)35} = 5\overline{)30\text{ ones} + 5\text{ ones}} = \ ?$

b. Can you find some useful parts which will help you to divide 35 into 7 equal parts?

$$7\overline{)35} = 7\overline{)21\text{ ones} + 14\text{ ones}} = \ ?$$



How Many Books?

Look at this picture. Counting by ones, how many books do you find? Can we count these books by 2's?

1. Count the books in groups of 10.

2. Do you see groups of tens and ones? How many of each?

3. If these books were to be put into two equal groups on a shelf, could you find how many there would be in each group without counting $(32 = 10 + 10 + 10 + 2)$?

4. How many groups of 2 are there in 3 tens and 2 ones? How many groups of 4?

5. How would you find the number of groups of 5 in 3 tens and 2 ones? How many ones are left over?

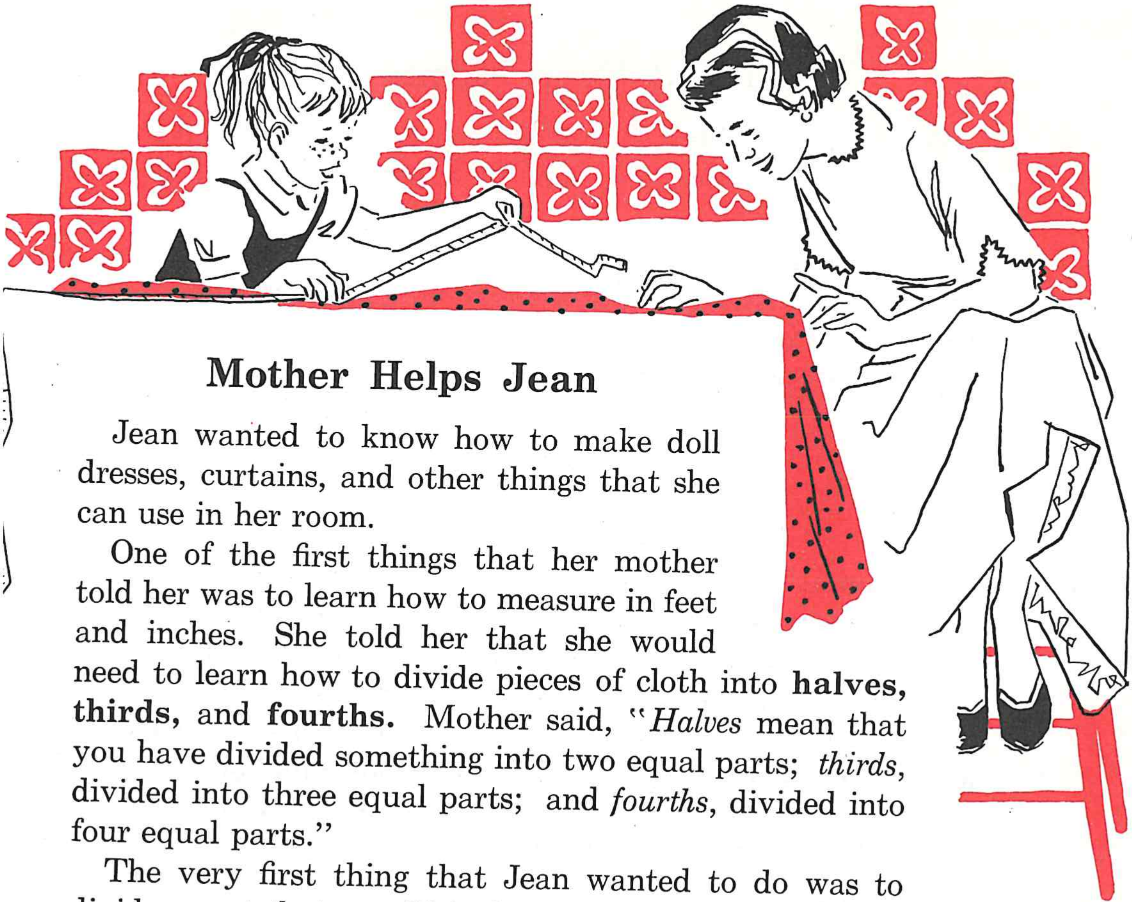
6. Betty told about the school where she used to go. She said there were 3 reading groups in her room. One group had 7 children, another group had 8 children, and a third group had 7 children. Would there be enough books on the reading-book shelf in the picture for each child to have one? How many would be left over?

7. Two of the girls are bringing books of games for the school party. There are 32 children in the room. Counting their teacher, and one mother, how many books will be needed for each person to have one?

8. You have made division facts out of these. See if you remember them:

5	4	6	8	9	9	3	4
a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
$6\overline{)30}$	$5\overline{)20}$	$5\overline{)30}$	$3\overline{)24}$	$4\overline{)36}$	$3\overline{)27}$	$8\overline{)24}$	$7\overline{)28}$
$6\overline{)24}$	$4\overline{)16}$	$3\overline{)12}$	$8\overline{)24}$	$9\overline{)27}$	$8\overline{)32}$	$9\overline{)36}$	$6\overline{)36}$
4	4	4	3	3	4	4	6

Problems — Using Grouping



Mother Helps Jean

Jean wanted to know how to make doll dresses, curtains, and other things that she can use in her room.

One of the first things that her mother told her was to learn how to measure in feet and inches. She told her that she would need to learn how to divide pieces of cloth into **halves, thirds,** and **fourths.** Mother said, "*Halves* mean that you have divided something into two equal parts; *thirds*, divided into three equal parts; and *fourths*, divided into four equal parts."

The very first thing that Jean wanted to do was to divide a mat that was 30 inches long into 2 mats.

Her mother told her that this is the way to think: "You take $\frac{1}{2}$ of 30; $\frac{1}{2}$ means one of the two equal parts, so, you divide $2\overline{)30}$ to find one part."

Which number in the fraction $\frac{1}{2}$ tells Jean to divide by 2 if she wants two equal parts? Which number tells her that she wants one of the two equal parts?

1. How many inches will Jean have in $\frac{1}{2}$ of 30 in.?

2. How many inches in $\frac{1}{3}$ of a yard?

3. What number do you divide by to find $\frac{1}{4}$ of 32 in.?

4. Find:

9

$\frac{1}{2}$ of 18	$\frac{1}{3}$ of 24	$\frac{1}{4}$ of 20	$\frac{1}{2}$ of 28	$\frac{1}{3}$ of 33	$\frac{1}{3}$ of 30

Fractional Parts of Groups

Odd and Even Numbers

You have probably heard people use the words *odd* and *even*. In arithmetic, odd and even have very special meanings.

a. If you are dividing a group of things into groups of two and have none left over, you say, "it comes out even." Any number which can be divided by 2 and gives a whole number for the answer is an **even number.** Thus, $2\overline{)6} = 3$ and $2\overline{)24} = 12$ tells you that 6 and 24 are even numbers.

b. If you are dividing a group of things into groups of two and have one left over, you have an odd number of things.

Any number that cannot be divided evenly by 2 is an **odd number.** Is 5 an odd number? Will counting by twos tell you whether a number is odd or even? Why?

1. Why are all tens numbers even numbers?

2. Would $36 = 30 + 6 = 10 + 10 + 10 + 6$ be an easy way to decide whether 36 is an even or odd number?

3. Can you tell by looking at the ending of 6 ones in 36 that it is an even number? Why? Does the division $2\overline{)36}$ prove it?

4. If any number ends in 0, 2, 4, 6, or 8, can it be divided evenly by 2? Explain your answer.

5. What kind of numbers are those ending in 1, 3, 5, 7, and 9?

6. Some numbers that can be divided evenly by 3 are even numbers. Others are odd numbers:

a. 24 is even; $2\overline{)24} = 12$, but also $3\overline{)24} = 8$.

b. 21 is odd; $2\overline{)21}$ does not come out evenly, but $3\overline{)21} = 7$.

7. Which of these numbers are odd and which are even?

10, 13, 9, 16, 8, 15, 19, 22, 26, 35, 29, 14, 32

Seeing Groups

If these books are put in groups of 2, will there be an even number of books in each group? Let's count to find out.

Count them by 5's.

Let's place these books in groups of 10: 1 group of 10, another group of 10, another group of 10, then a group of 5. Now there are 3 groups of 10 books and 1 group of 5 books. So 35 has 3 groups of 10 ones and 1 group of 5 ones.

1. If you wanted to put these books into groups of 2, how would you do it by counting?

2. Put them into groups of 4 by counting. Do you have any left over?

3. Can you re-group two piles of 10 books each by counting? How?

4. What would you do if you wanted groups of 6 of the books? How many groups would there be?

5. Why are you really dividing when you are getting answers to these questions?

Practice some of the things you have been learning:

How many 6's are there in 24?
How many 4's are there in 28?
How many 10's are there in 32?
How many 9's are there in 36?
How many 4's are there in 24?
How many 3's are there in 24?
How many 3's are there in 27?

$2\overline{)22}\qquad 6\overline{)36}\qquad 2\overline{)24}\qquad 2\overline{)28}$

$3\overline{)36}\qquad 5\overline{)25}\qquad 3\overline{)33}\qquad 3\overline{)39}$

$$\begin{array}{r}36\\-\ 24\\\hline\end{array}\qquad\begin{array}{r}12\\\times\ 3\\\hline\end{array}\qquad\begin{array}{r}18\\+\ 18\\\hline\end{array}\qquad\begin{array}{r}35\\-\ 6\\\hline\end{array}$$

$$\begin{array}{r}14\\\times\ 4\\\hline\end{array}\qquad\begin{array}{r}32\\+\ 18\\\hline\end{array}\qquad\begin{array}{r}21\\-\ 8\\\hline\end{array}\qquad\begin{array}{r}16\\\times\ 3\\\hline\end{array}$$

Do You Remember?

These are the division facts which you have been studying. Cover the answers in the columns. Write what you think the answers should be, then check them.

	a.	b.	c.	d.
1.	$2\overline{)4} = 2$	$3\overline{)15} = 5$	$4\overline{)16} = 4$	$5\overline{)5} = 1$
2.	$3\overline{)3} = 1$	$2\overline{)6} = 3$	$4\overline{)8} = 2$	$6\overline{)12} = 2$
3.	$5\overline{)10} = 2$	$3\overline{)12} = 4$	$2\overline{)8} = 4$	$4\overline{)4} = 1$
4.	$2\overline{)12} = 6$	$2\overline{)2} = 1$	$3\overline{)6} = 2$	$2\overline{)10} = 5$
5.	$4\overline{)12} = 3$	$2\overline{)14} = 7$	$5\overline{)15} = 3$	$3\overline{)18} = 6$
6.	$3\overline{)9} = 3$	$6\overline{)6} = 1$	$7\overline{)14} = 2$	$8\overline{)16} = 2$
7.	$8\overline{)32} = 4$	$7\overline{)35} = 5$	$5\overline{)30} = 6$	$4\overline{)36} = 9$
8.	$2\overline{)16} = 8$	$3\overline{)21} = 7$	$4\overline{)20} = 5$	$6\overline{)18} = 3$
9.	$6\overline{)30} = 5$	$4\overline{)32} = 8$	$9\overline{)36} = 4$	$5\overline{)35} = 7$
10.	$3\overline{)24} = 8$	$2\overline{)18} = 9$	$5\overline{)25} = 5$	$7\overline{)7} = 1$
11.	$4\overline{)24} = 6$	$3\overline{)27} = 9$	$7\overline{)21} = 3$	$8\overline{)24} = 3$

Answer the following questions:

12. If you know that $6 \times 6 = 36$, how does it help you to find the answer to $6\overline{)36}$?

13. Why would you have to give different labels to the answers in $5 \text{ apples}\overline{)20 \text{ apples}}$ and $5\overline{)20}$ apples?

14. How many groups of 5 things are there in 35 things? Is your answer labeled groups or things? Why?

15. How many 4's are there in $10 + 10 + 10 + 2$?

Do You Remember?

Cover the answers in each row and write what you think they should be on a piece of paper. Then uncover the answers and check what you have. Be sure to learn those which you do not know.

	a.	b.	c.	d.	e.	f.	g.	h.	i.
1.	$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$	$\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$	$\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$	$\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$	$\begin{array}{r} 4 \\ \times 2 \\ \hline 8 \end{array}$	$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$	$\begin{array}{r} 6 \\ \times 1 \\ \hline 6 \end{array}$	$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$	$\begin{array}{r} 4 \\ \times 8 \\ \hline 32 \end{array}$
2.	$\begin{array}{r} 1 \\ \times 2 \\ \hline 2 \end{array}$	$\begin{array}{r} 2 \\ \times 3 \\ \hline 6 \end{array}$	$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ \times 1 \\ \hline 4 \end{array}$	$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$	$\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$	$\begin{array}{r} 7 \\ \times 1 \\ \hline 7 \end{array}$	$\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$	$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$
3.	$\begin{array}{r} 3 \\ \times 1 \\ \hline 3 \end{array}$	$\begin{array}{r} 1 \\ \times 6 \\ \hline 6 \end{array}$	$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$	$\begin{array}{r} 2 \\ \times 4 \\ \hline 8 \end{array}$	$\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$	$\begin{array}{r} 3 \\ \times 4 \\ \hline 12 \end{array}$	$\begin{array}{r} 5 \\ \times 3 \\ \hline 15 \end{array}$	$\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$	$\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$
4.	$\begin{array}{r} 2 \\ \times 1 \\ \hline 2 \end{array}$	$\begin{array}{r} 3 \\ \times 5 \\ \hline 15 \end{array}$	$\begin{array}{r} 1 \\ \times 5 \\ \hline 5 \end{array}$	$\begin{array}{r} 2 \\ \times 6 \\ \hline 12 \end{array}$	$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$	$\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \end{array}$	$\begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array}$	$\begin{array}{r} 2 \\ \times 5 \\ \hline 10 \end{array}$	$\begin{array}{r} 1 \\ \times 4 \\ \hline 4 \end{array}$
5.	$\begin{array}{r} 1 \\ \times 7 \\ \hline 7 \end{array}$	$\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$	$\begin{array}{r} 4 \\ \times 5 \\ \hline 20 \end{array}$	$\begin{array}{r} 5 \\ \times 1 \\ \hline 5 \end{array}$	$\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$	$\begin{array}{r} 2 \\ \times 7 \\ \hline 14 \end{array}$	$\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$	$\begin{array}{r} 9 \\ \times 1 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$
6.	$\begin{array}{r} 2 \\ \times 8 \\ \hline 16 \end{array}$	$\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$	$\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$	$\begin{array}{r} 1 \\ \times 8 \\ \hline 8 \end{array}$	$\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$	$\begin{array}{r} 8 \\ \times 3 \\ \hline 24 \end{array}$	$\begin{array}{r} 9 \\ \times 2 \\ \hline 18 \end{array}$	$\begin{array}{r} 0 \\ \times 5 \\ \hline 0 \end{array}$	$\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$
7.	$\begin{array}{r} 1 \\ \times 9 \\ \hline 9 \end{array}$	$\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$	$\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$	$\begin{array}{r} 8 \\ \times 1 \\ \hline 8 \end{array}$	$\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$	$\begin{array}{r} 0 \\ \times 3 \\ \hline 0 \end{array}$	$\begin{array}{r} 2 \\ \times 6 \\ \hline 12 \end{array}$	$\begin{array}{r} 2 \\ \times 9 \\ \hline 18 \end{array}$	$\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$

Unit Review

1. How many tens and how many ones?

a. 36 = ? tens, ? ones
b. 38 = ? tens, ? ones
c. 31 = ? tens, ? one
d. 20 = ? tens, ? ones
e. 11 = ? ten, ? one
f. 18 = ? ten, ? ones
g. 7 = ? tens, ? ones
h. 17 = ? ten, ? ones
i. 29 = ? tens, ? ones
j. 25 = ? tens, ? ones

Multiply:

	a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
2.	6	8	5	7	4	4	9	3
	× 6	× 4	× 7	× 3	× 9	× 6	× 3	× 7
	36	32	35	21	36	24	27	21
3.	10	14	18	11	10	13	17	15
	× 3	× 2	× 2	× 2	× 2	× 3	× 2	× 2
	30	28	36	22	20	39	34	30

4. Divide by writing tens and ones:

$3\overline{)39}$ $2\overline{)28}$ $3\overline{)30}$ $2\overline{)24}$ $2\overline{)26}$ $3\overline{)30}$ $2\overline{)36}$ $2\overline{)30}$

5. Divide, thinking tens and ones:

$2\overline{)24}$ $2\overline{)20}$ $2\overline{)30}$ $2\overline{)28}$ $2\overline{)36}$ $3\overline{)36}$ $2\overline{)32}$ $2\overline{)22}$

6. Find the division facts:

$5\overline{)35}$ $9\overline{)27}$ $6\overline{)36}$ $4\overline{)32}$ $7\overline{)28}$ $3\overline{)27}$ $6\overline{)30}$ $7\overline{)21}$

7. Ann bought 2 pounds of bananas at 18¢ a pound. Find how much money she spent.

8. Dan divided 25 books into 5 equal piles. How many books were in each pile?

9. Jean mailed 6 letters with a 3¢ stamp on each. How much did these stamps cost in all?

10. Bob's hobby is soap carving. If he can carve 3 animals out of one bar of soap, how many can he carve out of 6 bars?

Unit Test

1. Mary spent 24¢ for 3 school notebooks. What was the price of each if each cost the same?

2. Sue bought 3 yds. of ribbon at 13¢ a yard. How much did she pay for the ribbon?

3. Jim divided 30¢ equally among 3 boys. How much did each receive?

4. How well can you do these?

a. Count to 30 by ones.

b. Write 2 tens and 7 ones as a number.

c. Count to 30 by twos.

d. Write 3 tens and 5 ones as a number.

e. Count to 30 by fives.

f. Add 12, 14, and 10 by tens and ones.

5. Answer the following questions:

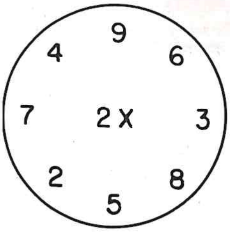
a. How many tens and ones in 36? (Give 3 answers.)

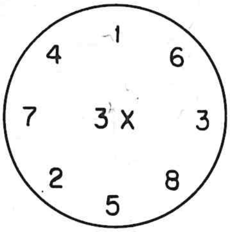
b. When dividing $2\overline{)22}$, where do you put the tens you have used? Where do you put the ones in the answer?

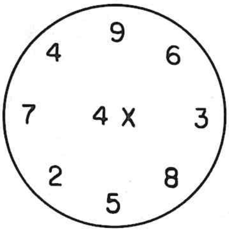
c. In what 3 ways can you prove a division is correct?

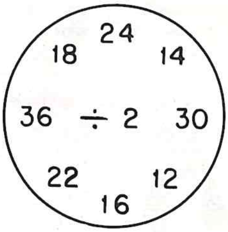
6. When would you use a ten as ones in subtraction?

7. See how quickly you can go around each wheel. Multiply the number in the center by each of the other numbers. Divide each number in the last wheel by 2.









8. Can you pass a box of candy twice if you have 38 pieces of candy in a box and there are 18 children? Why?

UNIT 3

Doing Things for Ourselves

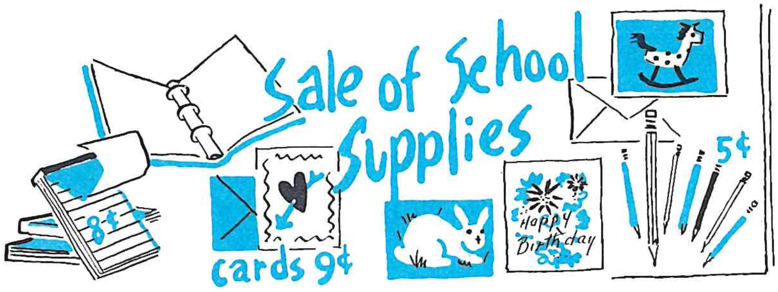
Just look at all the things Bill and Jane can do! Every day is a good day for them, because they can do so many things.

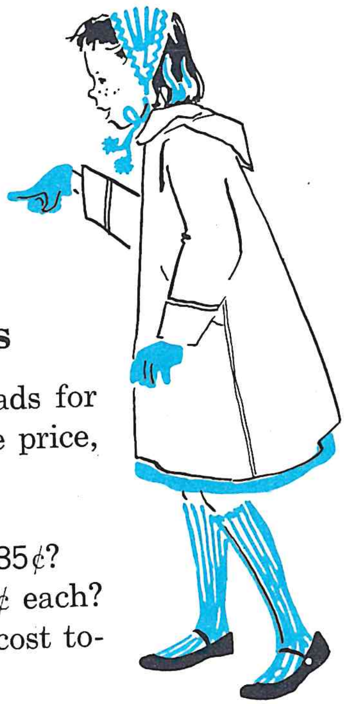
Have you ever done some of the things Bill and Jane are doing in these pictures? Jane and Bill must know numbers so they can do these things. Do you see the picture where they are making a house for their white rats? Their father has given them some boards which they have sawed into pieces. They measured the boards before they started to saw them up. Why do you think they did that?

Find the picture where the children are dividing candy for Halloween. They know how much candy they have. How can they divide it into equal parts? If they are getting ready for 8 people, and they have 48 candy suckers, how can they divide them equally?

Find the picture where the girls are having a sewing party. Jane's mother has given her a pretty piece of red cloth. She is going to cut out doll aprons for her own doll. Then, she thinks she will have enough cloth left so Patty and Anne can have some aprons for their dolls. Patty's and Anne's dolls are the same size as Jane's doll. Jane knows that she needs 6 inches for an apron for her doll. She measured the piece of cloth and found that it was a yard long. Jane knows the size of one part (6 inches). She knows how many parts of this size she can cut from the whole piece (1 yard). Do you know how many aprons Jane can cut from the yard? How did you get the answer?

Do you see Jane and Bill at the grocery store? If they bought 6 buns at 5¢ each do you know how much they paid for them? Can you find out how much 8 would cost?





Jane Buys More School Supplies

Jane needs to buy some pencils and writing pads for school. If she can buy several things at the same price, how can she figure how much they will cost her?

1. What will 5 pencils cost at 5¢ each?

2. Can you buy 4 writing pads at 8¢ each for 35¢?

3. How many cards can you get for 36¢ at 9¢ each?

4. How much will a writing pad and a pencil cost together at the prices shown in the picture?

5. You might need to work with 24¢ in different ways. Tell how you are working with the parts of 24¢ here:

$$\begin{array}{r}4\text{¢}\\4\text{¢}\\4\text{¢}\\4\text{¢}\\4\text{¢}\\4\text{¢}\\\hline\end{array}\quad\begin{array}{r}8\text{¢}\\8\text{¢}\\8\text{¢}\\\hline\end{array}\quad\begin{array}{r}9\text{¢}\\8\text{¢}\\7\text{¢}\\\hline\end{array}\quad\begin{array}{r}6\text{¢}\\6\text{¢}\\6\text{¢}\\6\text{¢}\\\hline\end{array}\quad\begin{array}{r}8\text{¢}\\\times 3\\\hline\end{array}\quad\begin{array}{r}4\text{¢}\\\times 6\\\hline\end{array}\quad 8\overline{)24\text{¢}}\quad 6\overline{)24\text{¢}}\quad 4\overline{)24\text{¢}}$$

$$\begin{array}{r}12\text{¢}\\\times 2\\\hline\end{array}\quad\begin{array}{r}6\text{¢}\\\times 4\\\hline\end{array}\quad\begin{array}{r}24\text{¢}\\-\ 19\text{¢}\\\hline\end{array}\quad 2\overline{)24\text{¢}}\quad\begin{array}{r}24\text{¢}\\-\ 12\text{¢}\\\hline\end{array}$$

6. 24 = 20 ones and ? ones.
24 = ? tens and 4 ones.
24 = 1 ten and ? ones.
24 = 2 tens and ? ones.

7. How many 8's are there in 24? how many 6's?

8. How many 3's are there in 24? how many 4's?

9. How many dozens are there in 24 things? (Use subtraction.)

10. Divide 24 cookies equally among 6 children. How many would each child get?

Review — Parts of Wholes

Getting Ready for a Play

Larry and Bill have the job of getting chairs for the class play. Miss O'Dare and the children decided there should be 48 chairs in all.

Larry and Bill are counting very carefully to be sure they have the right number. They say a number name for each chair. Why? They count until they say forty-eight on the last one. This tells them that there are forty and eight. Why?

How do you know when you get to forty in your counting? Forty is how many more than thirty-nine? Thirty-nine is 3 tens and 9 ones. Then forty must be 4 tens. Why?

You know how to write the number for thirty-nine, but do you know how to write the number for forty?

Why can we write it as 40?

40 = 4 tens and no ones. Why? Prove this with your counters.

48 = 4 tens and 8 ones.
48 = 48 ones.

Which place in any two-place number (like 48) is tens place? Which is ones place?

What is the most number of groups of 10 chairs that have been counted when you get to 48?

Meanings and Place-Values in 48

The Names of Numbers

While Bill was counting the chairs he said, "I know all the names of the numbers through the nineties."

Can you begin with forty and name all the numbers until you have finished with the nineties?

Do you know these names and what they mean?

10 — ten
20 — twenty
30 — thirty
40 — forty
50 — fifty
60 — sixty
70 — seventy
80 — eighty
90 — ninety
0 — not any
1 — one
2 — two
3 — three
4 — four
5 — five
6 — six
7 — seven
8 — eight
9 — nine

Which names in your counting through the nineties tell you that you have groups of ten only?

1. Write the number for each of these:

a. sixty-six   ninety-nine   fifty
b. seventy-two   eighty-four   seventy
c. forty-five   fifty-three   ninety

2. What are the names for these numbers? Write them:

36, 42, 56, 91, 80, 65, 77, 86, 59, 75, 44

3. Tell what figure is in tens place for each number in Problem 2. What figure is in ones place?

4. How can we say that 56 ones = 50 ones and 6 ones?

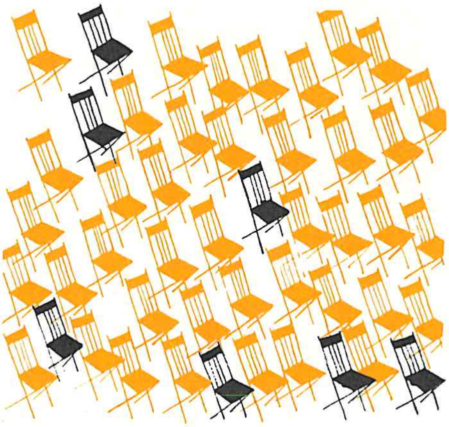
5. Count by tens as far as you can to 92. How many ones, besides these tens, will you have?

6. Write the names of the numbers, counting by tens, from ten through ninety. Do not look at the list at the top of the page until you are finished. Then check it to be sure you have spelled the words correctly.

7. How many tens and how many ones are showing in each of these numbers: 67, 18, 74, 66, 90, 82, 79, 53?

Number Names and Figures, 40 Through 90

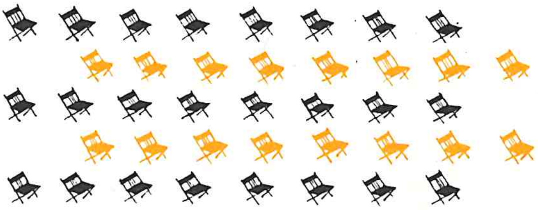
The Number 40



Are there enough chairs in this group to give Larry and Bill 40 chairs out of the 48 which they need? Do you have to count them by ones? Is counting by twos quicker?

If the chairs were placed in rows of 10 each, would it be easier to tell how many there are? Why?

If Larry and Bill needed only 40 chairs, could they put them in rows of 8 each?



Look at this picture:

Are there 8 chairs in each row?

How many rows are there?

How many 8's are there in 40?

We have learned these:

$$\begin{array}{r} 5 \text{ rows of chairs} \\ 8 \text{ chairs}\overline{)40 \text{ chairs}} \end{array} \qquad \begin{array}{r} 8 \text{ chairs} \\ \underline{\times\, 5 \phantom{\text{ chairs}}} \\ 40 \text{ chairs} \end{array} \qquad \begin{array}{r} 5 \\ 8\overline{)40} \end{array} \qquad \begin{array}{r} 8 \\ \underline{\times\, 5} \\ 40 \end{array}$$

1. Find these facts:

$$\begin{array}{r} ? \text{ rows of chairs} \\ 5 \text{ chairs}\overline{)40 \text{ chairs}} \end{array} \qquad \begin{array}{r} 5 \text{ chairs} \\ \underline{\times\, ? \phantom{\text{ chairs}}} \\ 40 \text{ chairs} \end{array}$$

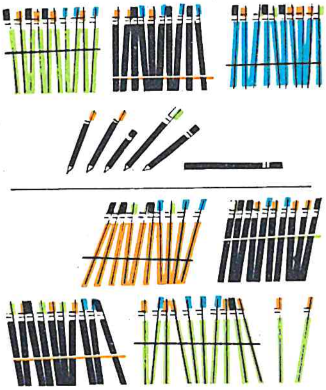
2. $5\overline{)40} = 5\overline{)4 \text{ tens and } 0 \text{ ones}}$ We cannot use this. Why?

3. $5\overline{)40} = 5\overline{)10 + 10 + 10 + 10}$ We can use this. Do this division.

Facts to remember:

$$\boxed{\begin{array}{r} 8 \\ 5\overline{)40} \end{array} \qquad \begin{array}{r} 5 \\ 8\overline{)40} \end{array} \qquad \begin{array}{r} 8 \\ \underline{\times\, 5} \\ 40 \end{array} \qquad \begin{array}{r} 5 \\ \underline{\times\, 8} \\ 40 \end{array}}$$

Numbers Have Many Parts



1. Which half of the picture has the greater number of pencils? How many more are there in that group? Can you find the answer by counting?

Can you find the answer more easily by using subtraction like this?

40 ones and 2 ones
– 30 ones and 6 ones

How would you do this subtraction?

2. How much more is 32 than 2 tens and 8 ones? Find the answer by counting first. Then use some other way to find it.

3. Look at these boxes: Use counters to prove that the amounts on each line of the first box equal 72.

72

7 tens	2 ones
6 tens	12 ones
	72 ones
4 tens	32 ones

4. Is the amount on each line in the second box equal to 40?

40

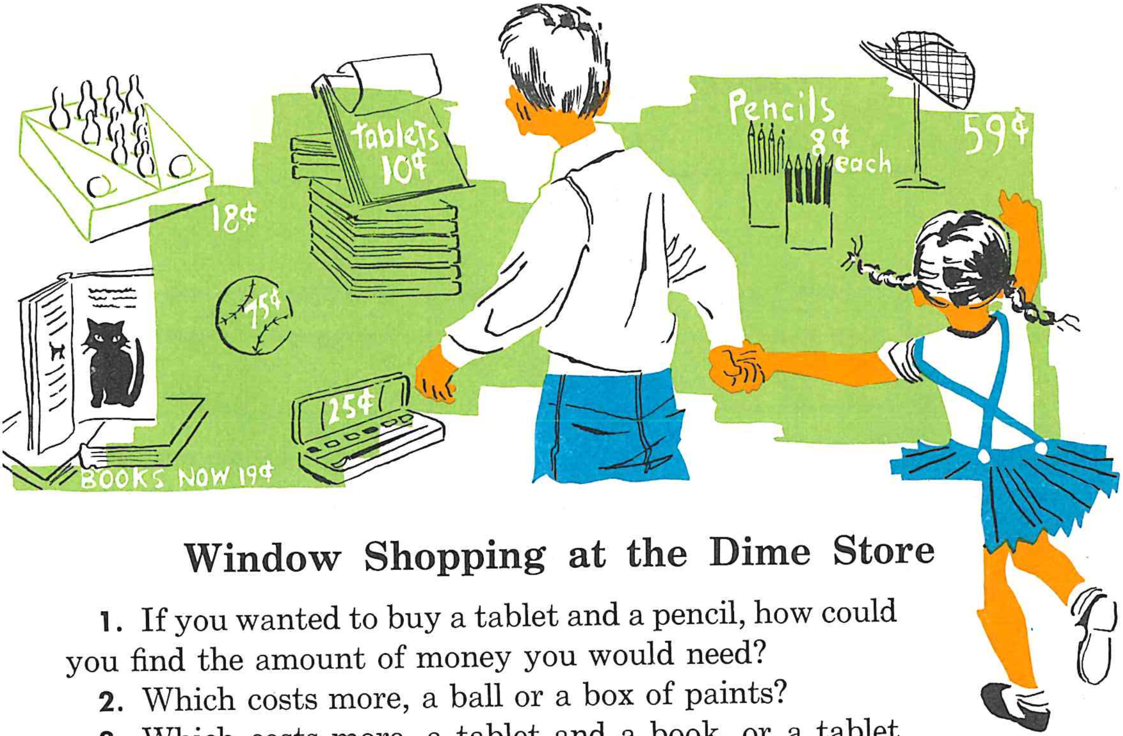
4 tens	0 ones
	40 ones
3 tens	10 ones
1 ten	30 ones

5. How many children are there in your classroom? Write the number of children first as tens and ones.

How many are boys? How many groups of 10 boys are there?

6. Count the chairs in your schoolroom. How many groups of 10 chairs are there?

Seeing Relations — All Ones, and Tens and Ones



Window Shopping at the Dime Store

1. If you wanted to buy a tablet and a pencil, how could you find the amount of money you would need?

2. Which costs more, a ball or a box of paints?

3. Which costs more, a tablet and a book, or a tablet and a pencil?

4. Two tablets and a cap would cost 79¢. This number says, "7 tens and 9 ones." You have to think that the 7 means 7 tens and the 9 means 9 ones. How do you know they mean this?

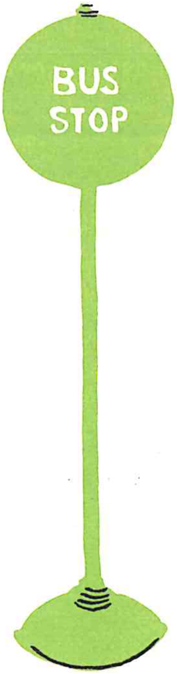
5. Can all two-place numbers like 64, 75, 89, and 34 be divided into tens and ones? Why?

6. Does 54 = 50 ones and 4 ones = 5 tens and 4 ones? Why?

7. Tell how many tens and ones are showing in each of these numbers: 76, 81, 15, 40, and 53.

8. Fran bought a game of ten pins and a book. How much did she spend? How many tens does the number show? How many ones?

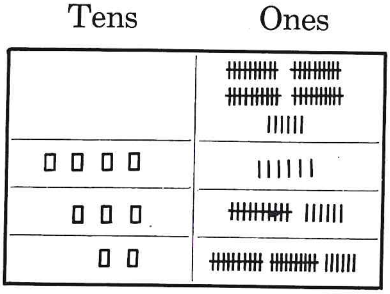
9. If Fran gave the clerk 40¢, how much change did she receive?



Number Values

Practice with Tens and Ones

46 =



=

Tens	Ones
	40 ones 6 ones
4 tens	6 ones
3 tens	16 ones
2 tens	26 ones

1. Tom had 46 cents and spent 21 cents. How many dimes and how many pennies could he have left? If the money he had left were all in pennies, how many pennies would he have?

2. The teacher has 52 pieces of paper and she wants to put as many of them as she can into groups of ten. How many groups of ten and how many ones will she have?

3. If she has 56 pencils and wants to do the same thing with them, how many tens and ones will she have?

4. There are 42 children in the room. If they are seated in rows of 10, how many rows of 10 will there be, and how many children will be left over for the last row?

5. How many rows of 10 children each can there be in a class of 40?

6. If Mary had 92 pennies and had some of them changed into 7 dimes, how many pennies would she have left?

7. Mary's father gave her 40¢ in dimes so both she and her brother could have lunch at school. A school lunch is 20¢. How many dimes did Mary give her brother?

8. Look at the table at the top of the page. Which one of the lines would you use to divide 46 into 2 equal parts most easily? Prove this by using counters and dividing them into 2 equal parts.

The Number 48

Bill cleans his room — well, once in a while. He always means to keep it clean, but there are so many more interesting things to do. Sometimes his mother has to tell him to clean his room this very minute!

Bill has 48 books. He wants to put an equal number on each of 2 shelves. He will have to know $2\overline{)48}$:

48 = ▯	▯	▯	▯	||||||||
1 ten	1 ten	1 ten	1 ten	8 ones.
		4 tens	and	8 ones

Why?

There will be 2 tens and 4 ones in each of the two equal parts. Why?

2 tens ▯▯ and 4 ones |||| = 24

2 tens ▯▯ and 4 ones |||| = 24

How many books would Bill put on each shelf?

Find the two equal parts of 48 ($2\overline{)48}$) by using tens and ones written out:

If we divide

$$\begin{array}{r}
\text{2 tens and 4 ones} = 24 \\
2\overline{)48} = 2\overline{)\text{4 tens and 8 ones}} \\
\underline{\text{4 tens}\qquad\qquad\quad} \\
\text{8 ones} \\
\underline{\text{8 ones}}
\end{array}$$

If we add to check

$$\begin{array}{rr}
\text{2 tens and 4 ones} & 24 \\
+\ \underline{\text{2 tens and 4 ones}} & +\ \underline{24} \\
\text{4 tens and 8 ones} & 48
\end{array}$$

If we subtract to check

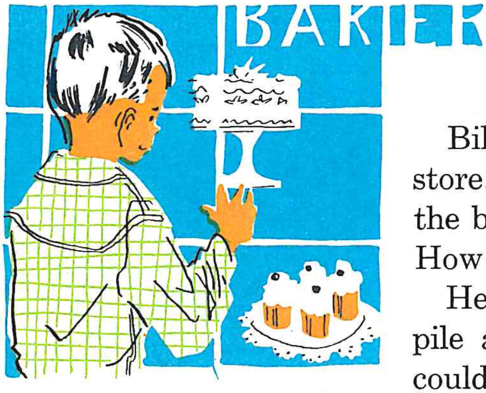
$$\begin{array}{rr}
\text{4 tens and 8 ones} & 48 \\
-\ \underline{\text{2 tens and 4 ones}} & -\ \underline{24} \\
\text{2 tens and 4 ones} & 24 \\
-\ \underline{\text{2 tens and 4 ones}} & -\ \underline{24} \\
 & 0
\end{array}$$

If we multiply to check

$$\begin{array}{rcr}
\text{2 tens and 4 ones} & & 24 \\
\underline{\times 2} & \text{or} & \underline{\times 2} \\
\text{4 tens and 8 ones} & & 48
\end{array}$$

Why?

Division — Using Tens and Ones



Bill Meets a New Problem

Bill is on his way home from the grocery store. He has 48¢ left to buy cupcakes at the bakery. The kind he likes cost 8¢ each. How many can he buy?

He remembered putting 48 counters in a pile and seeing how many groups of 8 he could make from them. Do this yourself.

$$\begin{array}{r} 24 \\ 2\overline{)48} \\ \underline{4} \\ 8 \\ \underline{8} \end{array}$$

Then Bill said, "I know that one-half of 48 is 24." Then he thought some more. "There are three 8's in 24, so there must be six 8's in 48."

Why did Bill say this?

Bill wondered if he could find the answer another way. He thought of these ways. Do the work both ways:

a. "I can add 8's."

$$\begin{array}{rl} 8 & \rightarrow 1 \\ \underline{8} & \rightarrow 2 \\ 16 & \\ \underline{8} & \rightarrow 3 \end{array}$$

finish the work

b. "I can subtract 8's to find how many 8's in 48."

$$\begin{array}{rl} 48 & \\ \underline{-\ 8} & \rightarrow 1 \\ 40 & \end{array}$$

finish the work

Then Bill thought of still another way: "I can use parts of 48¢." $8¢\overline{)48¢} = 8¢\overline{)32¢ \text{ and } 16¢} = \ ?$

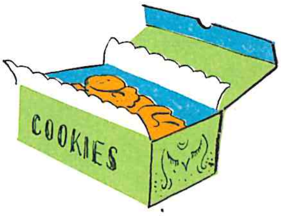
1. How many groups of 6 things are there in 48 things?

$6 \text{ ones}\overline{)48 \text{ ones}} = 6 \text{ ones}\overline{)30 \text{ ones} + 18 \text{ ones}} = \ ?$ $\quad \begin{array}{r} 6 \\ \underline{\times 8} \end{array}$

2. Write the answers to these facts:

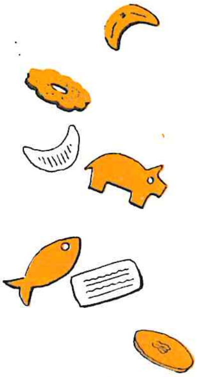
$8\overline{)48} \qquad \begin{array}{r} 8 \\ \underline{\times 6} \end{array} \qquad 6\overline{)48} \qquad \begin{array}{r} 6 \\ \underline{\times 8} \end{array}$

Refreshments after the Class Play



1. Jane and Patty are planning the refreshments to be served after their play. Cookies come in boxes of 48. If they put 8 cookies on each plate, how many plates will they need for each box of 48 cookies?

How many groups of 8 cookies are there in 48 cookies?

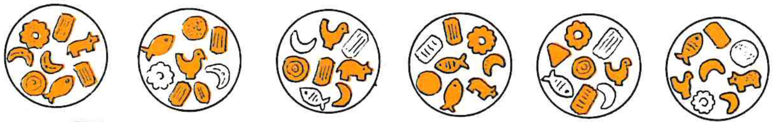


2. June is going to pour punch into paper cups. She has mixed 48 cups of punch. Paper cups come in packages of 6 cups each. How many packages of cups will Jane need for the 48 cups of punch?

Use 48 counters. Divide them into groups of 6.

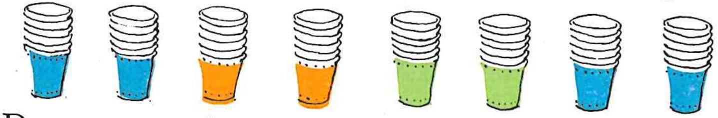
How many groups of 6 are there in 48?

3. The girls are checking to see how many cookies they have.



$$\begin{array}{r} 8 \text{ cookies} \\ \times\, 6 \phantom{\text{ cookies}} \\ \hline ? \text{ cookies} \end{array}$$

4. The girls want to be sure they have 48 cups.



$$\begin{array}{r} 6 \text{ cups} \\ \times\, 8 \phantom{\text{ cups}} \\ \hline ? \text{ cups} \end{array}$$

Do you see that 6 groups of 8 things give the same answer as 8 groups of 6 things?

Related Facts in Multiplication

Jane Puts the Sandwiches on Plates

Jane knows that there are 56 small sandwiches. She has 8 plates and wants to know how many sandwiches to put on each one so that they will be divided equally. Help Jane divide 56 into 8 equal parts.

a. $8\overline{)56} = 8\overline{)5 \text{ tens and } 6 \text{ ones}} = 8\overline{)50 \text{ and } 6}$. These parts cannot be divided evenly. Do you know why?

Try this: $8\overline{)4 \text{ tens and } 16 \text{ ones}} = 8\overline{)40 \text{ and } 16} = \ ?$.

You cannot divide 4 tens into 8 equal parts easily. But if you change them into 40 ones, you have division facts that you already know: $8\overline{)40}$ and $8\overline{)16}$. There are five 8's in 40; there are two 8's in 16. So, there are seven 8's in 56.

b. $8\overline{)56}$ 56 = 5 tens and 6 ones. Why?
56 = 4 tens and 16 ones. Why?

Jane can divide the 4 tens and 16 ones into two equal parts: $2\overline{)4 \text{ tens and } 16 \text{ ones}} = 28$. Why? $28 + 28 = 56$. Jane knows there are four 7's in 28, so there must be two groups of these, or eight 7's in 56.

$$\begin{array}{ccc} \multicolumn{3}{c}{56} \\ \hline 28 & + & 28 \\ \hline 7+7+7+7 & + & 7+7+7+7 \end{array}$$

Do you see that you found both a division and a multiplication fact?

$$\begin{array}{r} 7 \\ 8\overline{)56} \end{array} \qquad \begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$$

You know now that $56 = 28 + 28$. Use this to find one of the seven equal parts of 56:

$7\overline{)56} = 7\overline{)28 + 28} = \ ?$ $\qquad 7\overline{)56} \qquad \begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$

Using Parts in Finding Facts about 56

Sally and Her Brother Make Candy

Sally and her little brother are dividing their homemade candy among their friends. Sally counted the pieces of candy and found that there were 64. Now she wants to put them into 8 bags. Can you help her find the number that goes into each bag without putting 1 piece at a time in each bag?

Which one of these ways would you use to find $8\overline{)64}$?

a. $8\overline{)6 \text{ tens and } 4 \text{ ones}}$. You cannot find 8 equal parts of 64 by using 6 tens and 4 ones, can you? There are not enough tens.

b. $8\overline{)64} = 8\overline{)4 \text{ tens and } 24 \text{ ones}}$. Why can you use these parts of 64? $8\overline{)4 \text{ tens and } 24 \text{ ones}} = 8\overline{)40 \text{ and } 24}$ If you use 40 ones and 24 ones, you are using division facts you know. Find the answer.

c. $8\overline{)64} = 8\overline{)32 \text{ and } 32}$ Show how you could divide using these parts of 64.

You should remember these facts:

$$\begin{array}{r}8\\8\overline{)64}\end{array} \qquad \begin{array}{r}8\\\times 8\\\hline 64\end{array} \qquad \text{Eight 8's} = 64$$

1. If Sally had 8 piles of cookies with 8 in each pile, how many cookies did she have in all?

2. How many jelly beans would you get in each part if 64 jelly beans are to be divided into 8 equal parts?

Finding Eight Equal Parts in 64

Girls Like to Make Things

Jane is making a doll house. It is for two little girls who live in the house next to Jane. Jane's friend, Ann, is making the curtains for the windows and the bedclothes.

Jane has used two orange crates for the 4 rooms. She used wall paper to paper all the rooms. Now she has the roof to finish. She decides to make each side of the roof with boards, 8 inches long.

1. Jane found some boards that were 56 inches long. How many 8-inch pieces can she get from each board?

2. The boards Jane found are 4 inches wide. Jane thinks that 4 boards will be wide enough. How wide does she plan to make the roof?

3. Jane wants to nail a narrow piece of wood below each window for the window sill. The windows are 3 inches wide. How many window sills can she get from a narrow piece of wood that is 36 inches long?

4. Ann knows the windows are 3 inches wide and 6 inches high. She is going to draw a picture of the window and make it just this size so that she can measure her curtains by it. Draw a window for her.

5. Ruth is going to use brown paper for the doors inside the house. She thinks the doors should be 7 inches high. How many doors can she get out of a piece of paper 36 inches long?

Finding Out for Yourself

When you want to discover new facts in arithmetic, sometimes you can use one way and sometimes another way.

1. Suppose you want to find one of the 8 equal parts of 72. Will you divide $8\overline{)72}$? Why?

72 = 7 tens and 2 ones. Why?
72 = 6 tens and 12 ones. Why?
72 = 4 tens and 32 ones. Why?

You cannot divide the tens. Why? So change them this way:

$$8\overline{)72} = 8\overline{)40 + 32} = \ ? \qquad \begin{array}{r} ? \\ 8\overline{)72} \end{array} \qquad \begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

2. $7\overline{)49} = \ ?$
You cannot use $7\overline{)49} = 7\overline{)4\text{ tens} + 9\text{ ones}}$. Why?
Write the parts of 49 you would use to find $7\overline{)49}$.
If you use 35 as one part of 49, what is the other part?

$$\begin{array}{r} ? \\ 7\overline{)49} \end{array} \qquad \begin{array}{r} 7 \\ \times 7 \\ \hline ? \end{array}$$

Use counters to prove how many 7 × 7 are.

3. How many 9's are there in 63?
63 = 6 tens + 3 ones = 3 tens + 3 tens + 3 ones.

Then $9\overline{)63} = 9\overline{)30 + 30 + 3} = 9\overline{)27 + 27 + 9}$. Why?
What other parts of 63 could you use to find $9\overline{)63}$?

$$\begin{array}{r} ? \\ 9\overline{)63} \end{array} \qquad \begin{array}{r} 9 \\ \times ? \\ \hline 63 \end{array}$$

4. Use 63 counters. Make groups of 7 counters.

In $7\overline{)63}$, what parts of 63 could you use? $7\overline{)? + ? + ?}$
How many groups of 7 counters did you make from 63 counters?

$$\begin{array}{r} ? \\ 7\overline{)63} \end{array} \qquad \begin{array}{r} 7 \\ \times ? \\ \hline 63 \end{array}$$

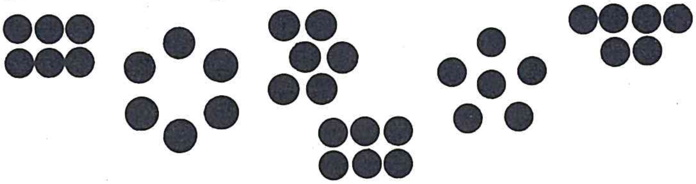
Division and Multiplication Facts in 72, 49, and 63

Number Facts

1. Bill doesn't know how many groups of 6 things there are in 42 things: $6 \text{ things}\overline{)42 \text{ things}}$.

He knows that three 6's are 18. He looks at 18 and knows that he can get closer to 42 than that.

If three 6's are 18, then six 6's are $18 + 18 = 36$. This is closer to 42. Try one more 6; $36 + 6 = 42$.



$$\begin{array}{r} ? \\ 6\overline{)42} \end{array} \qquad \begin{array}{r} 6 \\ \times\ ? \\ \hline 42 \end{array}$$

2. See if you can use some of the facts you already know to help you find the 6's in 54.

We know $6\overline{)48} = 8$. Then $48 + \ ? \ = 54$.

$$\begin{array}{r} ? \\ 6\overline{)54} \end{array} \qquad \begin{array}{r} 6 \\ \times\ ? \\ \hline 54 \end{array}$$

3. Find how many 9's there are in 45 by using

$$9\overline{)36 \text{ and } \ ?} \qquad 9\overline{)45} = \ ?.$$

4. Find how many 5's there are in 45:

$$5\overline{)30 \text{ and } \ ?} \quad \text{or} \quad 5\overline{)15 + 15 + \ ?}$$

$$\begin{array}{r} ? \\ 5\overline{)45} \end{array} \qquad \begin{array}{r} 5 \\ ? \\ \hline 45 \end{array}$$

5. Show how you could use parts of 42 to find how many 7's there are in 42:

$$7\overline{)42} = 7\overline{)\ ? \ + \ ?}$$

What other parts of 42 could you use?

$$\begin{array}{r} ? \\ 7\overline{)42} \end{array} \qquad \begin{array}{r} 7 \\ \times\ ? \\ \hline 42 \end{array}$$

6. Find how many 9's there are in 72 by thinking:

$$9\overline{)72} = 9\overline{)10 + 10 + 10 + 10 + 10 + 10 + 10 + 2}$$

$$\begin{array}{r} ? \\ 9\overline{)72} \end{array} \qquad \begin{array}{r} 9 \\ \times\ 8 \\ \hline ? \end{array}$$

7. Find the 7's in 63. Show your work.

$$\begin{array}{r} ? \\ 7\overline{)63} \end{array} \qquad \begin{array}{r} 7 \\ \times\ ? \\ \hline 63 \end{array}$$

Test Your Memory

1. $9\overline{)81}$ = ? (How many groups of 9 in 81?)

2. $9\overline{)72}$ = ? groups
3. $9\overline{)63}$ = ? groups
4. $9\overline{)45}$ = ? groups
5. $9\overline{)54}$ = ? groups
6. $8\overline{)72}$ = ? groups
7. $8\overline{)64}$ = ? groups
8. $8\overline{)56}$ = ? groups
9. $8\overline{)48}$ = ? groups
10. $8\overline{)40}$ = ? groups
11. $7\overline{)63}$ = ? groups
12. $7\overline{)56}$ = ? groups
13. $7\overline{)49}$ = ? groups
14. $7\overline{)42}$ = ? groups
15. $6\overline{)54}$ = ? groups
16. $6\overline{)48}$ = ? groups
17. $6\overline{)42}$ = ? groups
18. $5\overline{)45}$ = ? groups
19. $5\overline{)40}$ = ? groups

20. Fill the blanks:

$$\begin{array}{r} 9 \\ \times\ ? \\ \hline 18 \end{array} \quad \begin{array}{r} 9 \\ \times\ ? \\ \hline 72 \end{array} \quad \begin{array}{r} 9 \\ \times\ ? \\ \hline 63 \end{array} \quad \begin{array}{r} 9 \\ \times\ ? \\ \hline 54 \end{array} \quad \begin{array}{r} 9 \\ \times\ ? \\ \hline 45 \end{array} \quad \begin{array}{r} 8 \\ \times\ ? \\ \hline 72 \end{array} \quad \begin{array}{r} 8 \\ \times\ ? \\ \hline 64 \end{array} \quad \begin{array}{r} 8 \\ \times\ ? \\ \hline 56 \end{array} \quad \begin{array}{r} 8 \\ \times\ ? \\ \hline 48 \end{array}$$

21. How many cans of food could you buy for your puppy for 54¢ at 9¢ a can?

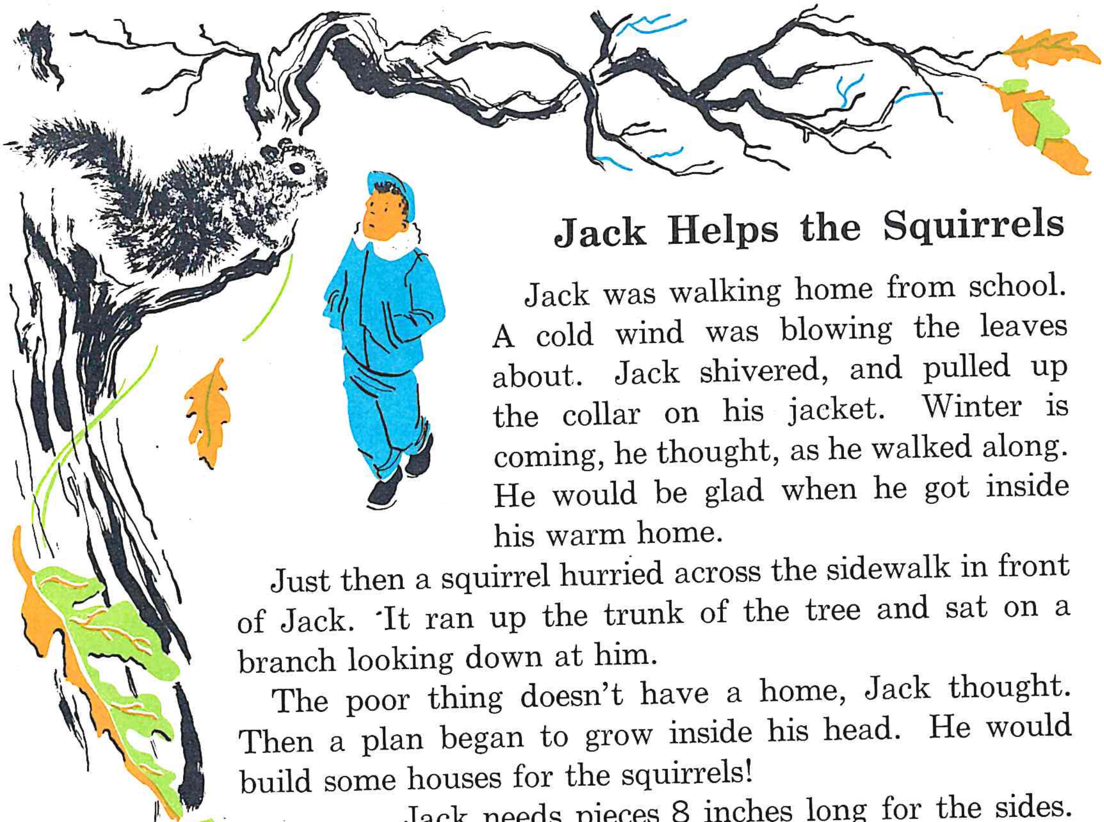
22. If you want to put 10 stamps on each page of your stamp book, how many pages would you need if you have 80 stamps?

23. Put 36 counters into groups of 4. How many groups do you get?

24. If 56 children were divided into teams of 8 children each, how many teams would there be?

25. Show how 8 × 8 is a times fact found by dividing 64 by 8.

Multiplication and Division Facts

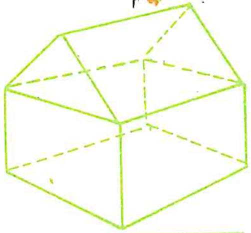


Jack Helps the Squirrels

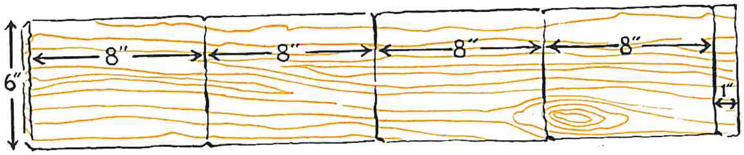
Jack was walking home from school. A cold wind was blowing the leaves about. Jack shivered, and pulled up the collar on his jacket. Winter is coming, he thought, as he walked along. He would be glad when he got inside his warm home.

Just then a squirrel hurried across the sidewalk in front of Jack. It ran up the trunk of the tree and sat on a branch looking down at him.

The poor thing doesn't have a home, Jack thought. Then a plan began to grow inside his head. He would build some houses for the squirrels!



Jack needs pieces 8 inches long for the sides. He has a board that is 33 inches long. How many 8 inch pieces can he cut from this board?



$$\begin{array}{r} 4 \\ 8\overline{)33}\text{ in.} \\ \underline{32} \\ 1\text{ in. left} \end{array}$$

Jack knows that 4 × 8 = 32 inches. He can get 4 pieces from this board, with 1 inch left over.

1. How many pieces 8 inches long can he get out of a 49 in. board?

2. If a board is 44 in. long, how much will be left over after Jack cuts off all of the 6 in. pieces he can?

More Practice for Skill

	a.	b.	c.	d.
1.	$6\overline{)18}$	$5\overline{)40}$	$9\overline{)63}$	$5\overline{)15}$
2.	$9\overline{)27}$	$3\overline{)9}$	$3\overline{)18}$	$6\overline{)36}$
3.	$6\overline{)48}$	$9\overline{)36}$	$9\overline{)54}$	$9\overline{)18}$
4.	$3\overline{)12}$	$5\overline{)25}$	$3\overline{)24}$	$5\overline{)10}$
5.	$6\overline{)12}$	$5\overline{)20}$	$9\overline{)45}$	$3\overline{)27}$
6.	$5\overline{)45}$	$3\overline{)21}$	$9\overline{)72}$	$3\overline{)6}$

7. John went to the post office for his father to buy 6¢ airmail stamps. His father gave him 45¢. How many stamps did John buy for 45¢? Will he have any money left over?

8. John met Mary at the post office. She was buying airmail stamps, too. She gave the clerk a half dollar and 4 pennies. How many airmail stamps did she buy?

9. Kate thinks she should get four airmail stamps for a quarter and have a penny left over. Is she right?

10. How many airmail stamps can you buy for each of these amounts? Is there any money left over? How much?

a. \$.35 **b.** \$.55 **c.** 30¢ **d.** 75¢ **e.** 20¢

11. Betsy saw 10¢ candy bars on sale for 7¢. How many can she buy for 50¢, and how much money will she have left over?

12. How many 7¢ candy bars can Joe buy for 65¢? How much money will he have left over?

13. Ellen would like to treat each of her 8 friends to a 7¢ ice cream cone. Is 50¢ enough money to pay for the cones? How do you know?

Division — Using Facts, Remainders

Do You Remember?

One 3 is ?
Two 3's are ?
Three 3's are ?
Four 3's are ?
Five 3's are ?
Six 3's are ?
Seven 3's are ?
Eight 3's are ?
Nine 3's are ?

One 4 is ?
Two 4's are ?
Three 4's are ?
Four 4's are ?
Five 4's are ?
Six 4's are ?
Seven 4's are ?
Eight 4's are ?
Nine 4's are ?

One 5 is ?
Two 5's are ?
Three 5's are ?
Four 5's are ?
Five 5's are ?
Six 5's are ?
Seven 5's are ?
Eight 5's are ?
Nine 5's are ?

If you have six 3's and a 6 in an addition, what is the shortest way of finding the answer?

3	5	3	4	6
3	5	3	4	6
3	6	2	5	6
+8	+4	+5	+6	+4

One 6 is ?
Two 6's are ?
Three 6's are ?
Four 6's are ?
Five 6's are ?
Six 6's are ?
Seven 6's are ?
Eight 6's are ?
Nine 6's are ?

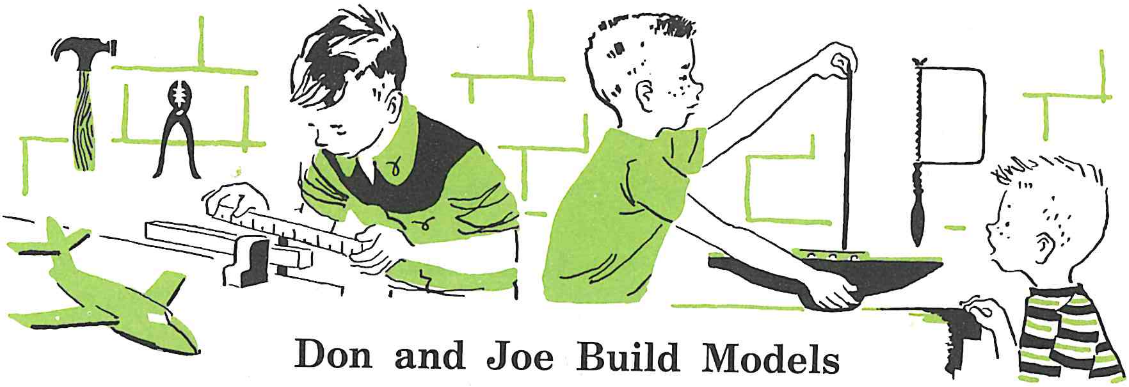
One 7 is ?
Two 7's are ?
Three 7's are ?
Four 7's are ?
Five 7's are ?
Six 7's are ?
Seven 7's are ?
Eight 7's are ?
Nine 7's are ?

One 8 is ?
Two 8's are ?
Three 8's are ?
Four 8's are ?
Five 8's are ?
Six 8's are ?
Seven 8's are ?
Eight 8's are ?
Nine 8's are ?

$1 \times 9 = ?$
$2 \times 9 = ?$
$3 \times 9 = ?$

$4 \times 9 = ?$
$5 \times 9 = ?$
$6 \times 9 = ?$

$7 \times 9 = ?$
$8 \times 9 = ?$
$9 \times 9 = ?$



Don and Joe Build Models

1. Don is making a model of a clipper ship. If the masts are to be 7 inches long, how many can he cut from a thin, round piece of wood that is 48 inches long?

2. Don is using narrow pieces of wood for the deck. He first needs 8 pieces that are 8 inches long. Can he cut 8 pieces from a board that is 62 inches long? Why, or why not?

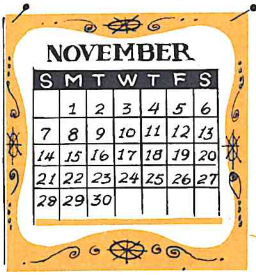
3. Some day Joe wants to be an airplane pilot. He has built many toy airplanes. He needs small pieces of wood for the tail. These pieces must be 4 inches long. How many pieces can he cut from a piece of wood that is 14 inches long and just wide enough for the tail pieces?

4. Joe needs airplane glue. It costs 8¢ a tube. How many tubes of glue can he get for 25¢?

5. Don thinks he has enough wood left so that Joe can make a pair of wings. The wood that he gave Joe was 12 inches long and 6 inches wide. This was just the right length for the wings. Joe wants each wing to be 3 inches wide. Is there enough wood for a pair of wings?

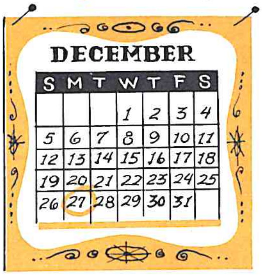
6. Joe bought some thin wire so that he could hang his airplanes from the ceiling in his room. He first cut pieces 45 inches long. But he found that pieces 19 inches long would be better. Can he cut 2 pieces from each of the longer pieces? How much wire will be left over from each 45 inch piece?

Problems



NOVEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				



DECEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

How Many Days?

Bill told Joe on the second day of November that he could hardly wait until his birthday on December 27. He said, "Boy, I hope that I get a football for a present."

Bill decided to count the days. When he found that there were 55 days, he was very sad. He said, "I know what I'll do. I'll count it by weeks. Then it won't seem so long."

About how many weeks are there in 55 days? Bill counted the weeks and found that it would be almost 8 weeks until his birthday. He knew he could wait 8 weeks.

1. How could Bill have found the number of days without counting each day?

2. How many weeks are there from November 2 until December 21? How many days are there in this many weeks?

3. How many days would Bill have to subtract from 8 weeks, counting both December 27 and November 2, to give the number of days until his birthday?

4. How many days are there in 4 weeks?

5. How many weeks are there in 25 days?

6. How many days are there altogether in November and December? Divide to see how many weeks there are in these 2 months. Do you have any days left over?

7. How many days in each of these?

a. 6 weeks **b.** 10 weeks **c.** 4 weeks **d.** 7 weeks

Using Zero in Multiplication and Division

Have you ever thought that there might be multiplications using zero? You know you have use for zero when there are no ones in a number. 60 = 6 tens and 0 (not any) ones.

1. $\begin{array}{r} 0 \\ \times 9 \\ \hline 0 \end{array}$ This means not any things taken 9 times. What is the answer? If you have not any to begin with, you will still have not any, no matter how many times you multiply, won't you?

Does $0+0+0+0+0+0+0+0+0=0$ show you that $9\times0=0$?

Can you tell why these would be true?

$$\begin{array}{r} 0 \\ \times 8 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 7 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 6 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 5 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 4 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 3 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 2 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ \times 1 \\ \hline 0 \end{array}$$

2. $4\overline{)0} = 0$ This means "not any" divided into 4 equal parts. If you didn't have anything to begin with, you still wouldn't have anything, no matter how you divided it.

3. Can you tell why these would be true? $\begin{array}{r} 0 \\ 3\overline{)0} \end{array} \quad \begin{array}{r} 0 \\ 2\overline{)0} \end{array} \quad \begin{array}{r} 0 \\ 7\overline{)0} \end{array}$

4. Jack wants to know what 6 × 9 is. He thinks this way: six 10's = 60 (6 × 10). So, six 9's would be one less than 10 taken 6 times, or ?.

Let's see for sure if six 10's = 60: $\begin{array}{r} \text{1 ten and 0 ones} \\ \times 6 \\ \hline \text{? tens and ? ones} \end{array}$

5. How many are 4 × 10?

Then, 4 × 9 would be ? less than 40, or ?.

6. $\begin{array}{r} 20 \\ \times 4 \\ \hline \end{array} = \begin{array}{r} \text{2 tens and 0 ones} \\ \times 4 \\ \hline \text{? tens and ? ones} \end{array} = \ ? \qquad \begin{array}{r} 40 \\ \times 2 \\ \hline \end{array} = \begin{array}{r} \text{4 tens and 0 ones} \\ \times 2 \\ \hline \text{? tens and ? ones} \end{array}$

Going to the New Store

Bill found 3 key chains at the new store that he liked very much. He is going to give 2 of them to his friends and keep 1 for himself. Each key chain cost 8¢.

Bill thought: three 8's (3 × 8) = 24. I have spent 24¢.

Find these sums:

6¢	8¢	9¢	3¢	5¢	3¢	7¢	4¢
6¢	8¢	9¢	3¢	5¢	3¢	7¢	4¢
6¢	8¢	9¢	3¢	5¢	3¢		4¢
	8¢	9¢		5¢	3¢		4¢

Jane bought a tiny turtle that cost 9¢, a game that cost 8¢, and a candy bar that cost 3¢. She did not want to spend more than 25¢.

9¢
8¢
3¢

Jane thought, "I will have to add because the numbers are not the same." Build tens as Jane did and find the answer.

9¢
8¢ ● ●●●●●●●
3¢
?¢

Peter bought three boxes of trading cards for 6¢ each, bubble gum for 1¢, and a top for 5¢.

Peter began to add. He thought, "Three 6's = 18; 18 and 1 = 19; 19 and 5 = 24."

6¢
6¢
6¢
1¢
5¢ ● ●●●●

Find these sums:

3	5	7	2	9	8	6	2	4	3
3	5	7	2	9	3	6	6	4	3
3	1	3	4	9	3	5	6	4	3
2	1	3	+4	+1	3	+5	+6	4	+7
+2	+1	+1			+3			+2	

Additions with Some Equal Parts (Multiplication with the Equal Parts)

Figure Fun

Find the times facts when these numbers are divided into equal parts:

$$8\overline{)48} = \begin{array}{l} \;\;5 + 1 = 6 \\ 8\overline{)40 + 8} \end{array} \qquad 8 \times 6 = 48$$

1. $8\overline{)72} = 8\overline{)48 + \;?} \quad = \;?$ $\quad 8 \times \;? \; = 72$
2. $6\overline{)42} = 6\overline{)30 + 12} \quad = \;?$ $\quad 6 \times \;? \; = 42$
3. $6\overline{)48} = 6\overline{)36 + 12} \quad = \;?$ $\quad 6 \times \;? \; = 48$
4. $6\overline{)54} = 6\overline{)\;? \; + 6} \quad = \;?$ $\quad 6 \times \;? \; = 54$
5. $5\overline{)40} = 5\overline{)\;? \; + 20} \quad = \;?$ $\quad 5 \times \;? \; = 40$
6. $5\overline{)45} = 5\overline{)\;? \; + 25} \quad = \;?$ $\quad 5 \times \;? \; = 45$
7. $7\overline{)42} = 7\overline{)21 + \;?} \quad = \;?$ $\quad 7 \times \;? \; = 42$
8. $7\overline{)49} = 7\overline{)35 + \;?} \quad = \;?$ $\quad 7 \times \;? \; = 49$
9. $7\overline{)63} = 7\overline{)49 + \;?} \quad = \;?$ $\quad 7 \times \;? \; = 63$
10. $9\overline{)45} = 9\overline{)36 + \;?} \quad = \;?$ $\quad 9 \times \;? \; = 45$
11. $9\overline{)45} = 9\overline{)27 + \;?} \quad = \;?$ $\quad 9 \times \;? \; = 45$
12. $9\overline{)63} = 9\overline{)27 + 27 + \;?} = \;?$ $\quad 9 \times \;? \; = 63$
13. $9\overline{)72} = 9\overline{)36 + \;?} \quad = \;?$ $\quad 9 \times \;? \; = 72$
14. $8\overline{)56} = 8\overline{)32 + \;?} \quad = \;?$ $\quad 8 \times \;? \; = 56$
15. $7\overline{)56} = 7\overline{)35 + \;?} \quad = \;?$ $\quad 7 \times \;? \; = 56$
16. $8\overline{)64} = 8\overline{)40 + \;?} \quad = \;?$ $\quad 8 \times \;? \; = 64$
17. $6\overline{)36} = 6\overline{)\;? \; + 12} \quad = \;?$ $\quad 6 \times \;? \; = 36$
18. $8\overline{)48} = 8\overline{)\;? \; + 8} \quad = \;?$ $\quad 8 \times \;? \; = 48$

Unit Review

Give the answers to each of the following division problems by thinking how many groups of a given size there are in the larger group. Give the multiplication fact that tells the story about the number of groups.

1. $7\overline{)42} = 42 \div 7 = ?$ $\qquad ? \times 7 = 42$
2. $9\overline{)45} = 45 \div 9 = ?$ $\qquad ? \times 9 = 45$
3. $8\overline{)48} = 48 \div 8 = ?$ $\qquad ? \times 8 = 48$
4. $9\overline{)72} = 72 \div 9 = ?$ $\qquad ? \times 9 = 72$
5. $7\overline{)63} = 63 \div 7 = ?$ $\qquad ? \times 7 = 63$
6. $9\overline{)54} = 54 \div 9 = ?$ $\qquad ? \times 9 = 54$
7. $5\overline{)40} = 40 \div 5 = ?$ $\qquad ? \times 5 = 40$
8. $7\overline{)56} = 56 \div 7 = ?$ $\qquad ? \times 7 = 56$
9. $8\overline{)72} = 72 \div 8 = ?$ $\qquad ? \times 8 = 72$
10. $6\overline{)42} = 42 \div 6 = ?$ $\qquad ? \times 6 = 42$
11. $5\overline{)45} = 45 \div 5 = ?$ $\qquad ? \times 5 = 45$
12. $9\overline{)63} = 63 \div 9 = ?$ $\qquad ? \times 9 = 63$
13. Zero divided by any number = ?. Why?
14. Zero multiplied by any number = ?. Why?
15. Tell how you can use multiplication in finding $6 + 6 + 6 + 6 + 3 + 3 = 30$.
16. Tell how you could find how many 8's there are in 72 by using the parts

$$8\overline{)72} = 8\overline{)10 + 10 + 10 + 10 + 10 + 10 + 10 + 2}.$$

Be sure that you don't lose the number left over in each ten.

Unit Test

1. a. Tell why multiplying is a short way of adding.

b. Tell why $8 \times 5 = 40$ is a fact that will help you to find $8\overline{)40}$.

c. Tell why 72 is 7 tens and 2 ones.

2. Draw pictures for each of these problems and then find the answers:

a. Mary bought 9 six-cent airmail stamps. What did they cost?

b. Jack divided 40 boys into 5 equal groups for a game. How many boys were in each group?

c. Sally divided 56 cookies into 8 equal groups. How many cookies were there in each group?

d. How many 8 inch pieces can Jack get from a 48 inch board?

3. Find the answers:

$$\begin{array}{cccccccc} 7 & 8\overline{)56} & 8 & 9\overline{)81} & 7 & 9 & 7 & 9\overline{)63} \\ \underline{\times 6} & & \underline{\times 6} & & \underline{\times 8} & \underline{\times 8} & \underline{\times 5} & \end{array}$$

$$\begin{array}{cccccccc} 8\overline{)72} & 9 & 7 & 7\overline{)49} & 6 & 9 & 6\overline{)42} & 5\overline{)45} \\ & \underline{\times 7} & \underline{\times 9} & & \underline{\times 9} & \underline{\times 6} & & \end{array}$$

4. How many weeks are there, and how many days left over, in 54 days? in 35 days? in 19 days?

5. Write all the multiplication and division facts that you can remember about the number 56.

6. $9 \times 0 = \ ?$ $\quad 4\overline{)0} = \ ?$

$$\begin{array}{r} \text{3 tens and 0 ones} \\ \underline{\times 3} \end{array} = \ ?$$

$$4\overline{)\text{8 tens and 0 ones}} = \ ?$$

UNIT 4

Work and Play on the Farm

Farm children, as well as city children, need to be able to add well. Just the other day John fed his pigs too much corn and they all got stomach aches. It all came about when he did not add right, and fed them too many ears of corn.

Can you think how Pat Horn uses addition to keep a record of the gallons of milk he sells and the money he earns from it?

Why would you need to know how to add if you raised chickens? Would you need to know how to add to grow a garden? If you sell some of your vegetables at a roadside stand, how would you use addition?

The children in this unit go to a country school. It is lots of fun. They have such a large yard to play in, that they can run and shout as much as they want.

After school, there are things to do at home — your pets have been waiting for you all day. They are so glad to see you. The chickens all cluck at once when you go to get the eggs or take water to them. They all want to say "Howdy do" to you. Your pet pig's tail curls up tightly — he's so glad to see you. Then there's Brown Belle, the cow. She is full of mischief. She hides from you when you go to look for her.

Watch out for that big turkey!

Will you need addition if you are going to buy baby chickens and raise them? If so, why will you need it?

John and Ann think that the County Fair is the most fun of all! They will show their pigs at the Fair. How will they need addition? Suppose you wanted to take some of your friends for a ride on the merry-go-round at the Fair, why would you need to be able to add?

Ann and John Go to a Country School

Ann and John live on a farm. They walk one mile to school. They are careful to walk on the left side of the road so that they face the cars coming toward them. This morning Ann is counting all the red and green cars, and John is counting the black and blue cars.

Ann saw 8 red and green cars. John counted 9 black and blue cars. John said, "Eight cars and 2 more are 10 cars, 10 and 7 are 17 cars. We saw 17 cars in all."

Ann asked, "How did you do that?"

He said, "I looked at the 8 and knew that I needed 2 more to make 10. I separated the 9 into the parts 2 and 7. Then I thought, 8 and 2 more are 10; $10 + 7 = 17$."

$$\begin{array}{l} \;\;\;8 \\ +9 \begin{array}{l} \diagup 2 \\ \diagdown 7 \end{array} \end{array} \qquad \begin{array}{l} 8 + 2 = 10 \\ 10 + 7 = 17 \end{array}$$

Ann thought that she would try it.

She saw 7 horses and 8 cows in the field. "Seven and 3 more make 10; 10 and 5 are 15. I saw 15 animals in all."

Ann counted the trees on one side of the lane to the Jones' farm. John counted them on the other side. Ann counted 8 trees. John's side had 5 trees.

They figured together; 8 trees + 5 trees. In their minds they saw 5 like this: ●●●●● Then they thought, "$8 + 2 = 10$; $10 + 3 = 13$."

Adding by Parts — Building a Ten

More about Adding

Ann played being the teacher the rest of the way to school. "There are 7 brown fence posts and 6 white fence posts. How many are there in all?"

John said, "Seven and 6 are 13. You can separate the 6 into 3 and 3. Think that 7 and 3 are 10, then 10 and 3 more = 13."

$$\underbrace{\overbrace{●●●●●●● + (●●●)}^{7 \; + \; 6} \;\; (●●●)}_{7 \; + \; 3 \; + \; 3 \; = \; 13}$$

Then Ann gave him another problem: "There are 6 cherry trees and 8 apple trees. How many cherry and apple trees are there in all?"

John thought 6 and 4 are 10; 10 and 4 are 14.

$$\underbrace{\overbrace{●●●●●● + (●●●●)}^{10} + \overbrace{(●●●●)}^{4}}_{6 \; + \; 4 \; + \; 4 \; = \; 14}$$

1. $\begin{array}{r} 7 \\ \underline{+9} \end{array} \!\!<\!\! \begin{array}{l} 3 \\ 6 \end{array}$ $\quad 7 + 3 = 10; \;\; 10 + 6 = 16$

$\begin{array}{r} 6 \\ \underline{+5} \end{array} \!\!<\!\! \begin{array}{l} 4 \\ 1 \end{array}$ $\quad 6 + \;?\; = 10; \;\; 10 + \;?\; = \;?$

2. See how many different groupings of two parts you can make out of 9; out of 7.

3. Add, using parts of the second number to make 10 and some more:

a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
8 +7	9 +5	7 +6	8 +9	4 +7	9 +9	6 +4	3 +8	8 +6	8 +8
6 +7	7 +8	5 +6	8 +8	5 +8	7 +9	5 +7	9 +1	6 +8	6 +5

Seeing Parts of Numbers in Addition — Building Tens

Do You Remember?

1. Make as many groupings of 2 parts, using 8, as you can. Use your counters. Here are two groupings:

●●● ●●●●● ●●●● ●●●●

Add these, drawing circles or X's to show how you used parts of 8 to make 10 and some more:

$$\begin{array}{r} 9 \\ +8 \\ \hline 17 \end{array}$$ ● ●●●●●●●

$$\begin{array}{rrrrrr} 7 & 8 & 5 & 6 & 9 & 4 \\ +8 & +8 & +8 & +8 & +8 & +8 \\ \hline \end{array}$$

2. Write the parts of the bottom number to show how to make a 10 and some more in the addition:

$$\begin{array}{rl} 7 & 3 \\ +6 & \\ \hline 13 & 3 \end{array}$$

$$\begin{array}{rrrrrrrrr} \textbf{a.} & \textbf{b.} & \textbf{c.} & \textbf{d.} & \textbf{e.} & \textbf{f.} & \textbf{g.} & \textbf{h.} & \textbf{i.} \\ 6 & 5 & 9 & 7 & 6 & 8 & 9 & 6 & 7 \\ +8 & +6 & +6 & +6 & +6 & +9 & +9 & +9 & +9 \\ \hline \end{array}$$

3. Do you remember your addition facts? You will be using them every day, so it will be much easier for you if you know them. Do each of these additions:

$$\begin{array}{rrrrrrrrr} 9 & 6 & 8 & 4 & 7 & 8 & 4 & 9 & 5 \\ +5 & +3 & +9 & +5 & +6 & +3 & +6 & +6 & +5 \\ \hline \end{array}$$

$$\begin{array}{rrrrrrrrr} 7 & 6 & 5 & 7 & 4 & 9 & 5 & 8 & 5 \\ +2 & +8 & +9 & +3 & +7 & +4 & +6 & +4 & +8 \\ \hline \end{array}$$

$$\begin{array}{rrrrrrrrr} 6 & 8 & 9 & 6 & 9 & 5 & 6 & 9 & 5 \\ +9 & +6 & +7 & +5 & +3 & +8 & +4 & +8 & +7 \\ \hline \end{array}$$

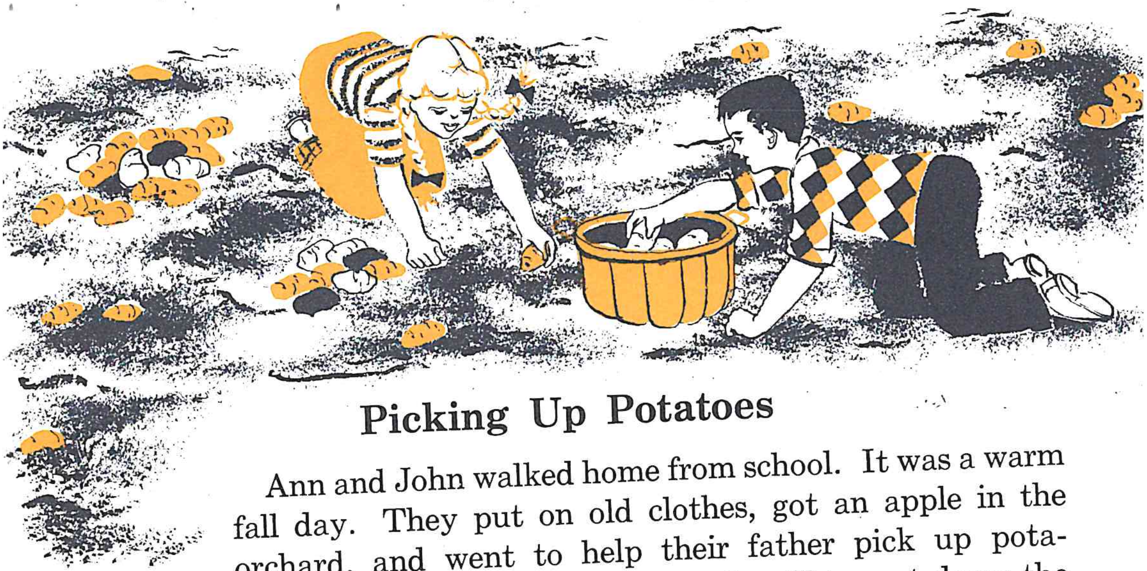
$$\begin{array}{rrrrrrrrr} 9 & 7 & 8 & 5 & 7 & 9 & 4 & 8 & 7 \\ +2 & +5 & +3 & +7 & +4 & +9 & +8 & +5 & +7 \\ \hline \end{array}$$

Addition Facts

Fold a piece of paper to make narrow strips. Write the answers on the strips by rows. Check your answers with another pupil. Learn any that you do not know by using your counters.

Add the following:

	a.	b.	c.	d.	e.	f.	g.	h.	i.
1.	1 1	6 2	3 4	2 5	1 6	6 7	2 8	6 9	9 9
2.	3 5	2 1	2 4	3 6	9 2	6 3	7 7	8 8	5 9
3.	1 3	7 2	3 1	1 4	4 5	2 6	1 8	4 9	8 7
4.	5 4	2 3	8 2	4 1	4 6	3 9	5 5	5 7	2 9
5.	9 3	4 4	3 3	6 5	5 1	1 9	5 6	5 8	9 7
6.	1 5	7 5	4 2	6 4	7 6	6 1	4 7	3 8	9 8
7.	8 3	7 4	3 2	4 3	8 5	6 6	7 1	8 6	3 7
8.	5 3	2 2	8 4	6 8	5 2	1 7	9 5	8 1	4 8
9.	9 1	8 9	7 3	9 4	2 7	7 8	9 6	7 9	1 2



Picking Up Potatoes

Ann and John walked home from school. It was a warm fall day. They put on old clothes, got an apple in the orchard, and went to help their father pick up potatoes. Ann put 15 potatoes in a pile. She went down the row, picking up 8 more which she brought back to the pile. She thought to herself, "15 and 8 are how many?

$$\begin{array}{r} 15 \\ +\ 8 \\ \hline \end{array}$$

15 = 10 and 5. If I use parts of 8, I can think, 10 + 5 = 15; 15 + 5 = 20; 20 + 3 = 23."

Another way this could be added would be to add the ones first. If you do not know how many 5 and 8 are, you can build a ten.

$$\begin{array}{r} 15 \\ +\ 8 \\ \hline 3 \end{array} \begin{array}{l} \nearrow 5 \\ \searrow 3 \end{array}$$

5 + 5 = 10; 10 + 3 = 13 (1 ten and 3 ones).

Write 3 in ones place in the answer and hold the 1 ten.

Now add the tens: 1 ten + 1 ten that we held = 2 tens. Write 2 in tens place in the answer.

The answer is 23.

$$\begin{array}{r} 15 \\ +\ 8 \\ \hline 23 \end{array}$$

1. Add these. Use parts of a number if they will help you:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
57	53	49	18	34	16	54	19
26	18	27	16	19	24	17	35

Finding How Many Potatoes

As John worked, he counted the potatoes. He filled his pail with 18 potatoes and put them in a pile. Then he picked up 19 more.

He thought, "Now I have 18 potatoes and 19 potatoes in the pile. How many is that in all?"

$$\begin{array}{r} 18 \\ +\ 19 \\ \hline \end{array} = \begin{array}{r} 1 \text{ ten and } 8 \text{ ones} \\ +\ 1 \text{ ten and } 9 \text{ ones} \\ \hline \end{array}$$

Will there be as many as 4 tens in the answer? Why?

$$\begin{array}{r} 18 \\ +\ 19 \\ \hline ? \end{array} \begin{array}{l} 2 \\ 7 \end{array}$$

$$\begin{array}{r} 18 \\ +\ 19 \\ \hline 37 \end{array} \begin{array}{l} 2 \\ 7 \end{array}$$

Add the ones: 8 + 9 = 8 + ? + ? = ?. Into what parts did you separate the 9?

In 17 ones, there is 1 ten and ? ones. Hold the 1 ten for the tens column. Write the ones in ones place in the answer.

Now add the tens column. 2 tens + the 1 ten you held = ? tens. 3 tens and 7 ones = 37.

$$\begin{array}{r} 27 \\ +\ 14 \\ \hline \end{array}$$

Here is another addition that John did. Add with him:

$$\begin{array}{r} 27 \\ +\ 14 \\ \hline \end{array} = \begin{array}{r} ? \text{ tens and } ? \text{ ones} \\ +\ ? \text{ ten and } ? \text{ ones} \\ \hline \end{array}$$

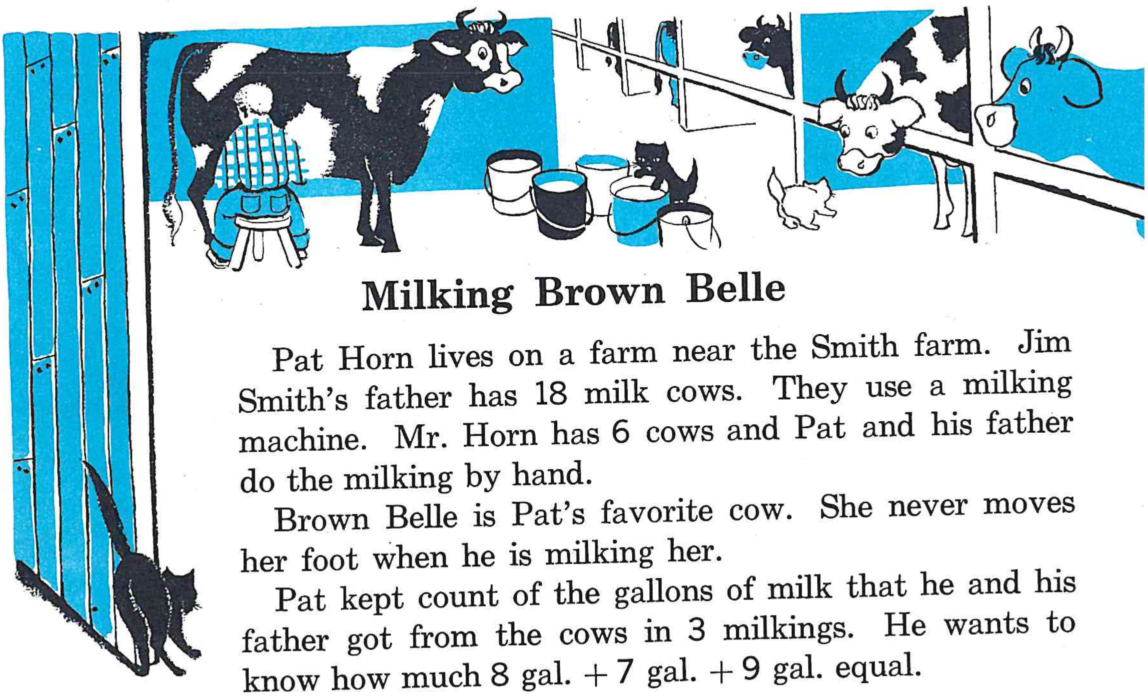
Add the ones first. How many tens do you get?

Before you do any more addition, be sure you know all of the groupings of two parts in the numbers up to 9. Practice like this:

9 = 3 and 6
8 = ? and ?
8 = ? and ?
8 = ? and ?
8 = ? and ?

9 = 1 and 8
7 = ? and ?
7 = ? and ?
7 = ? and ?
7 = ? and ?

9 = 2 and 7
6 = ? and ?
6 = ? and ?
6 = ? and ?
6 = ? and ?



Milking Brown Belle

Pat Horn lives on a farm near the Smith farm. Jim Smith's father has 18 milk cows. They use a milking machine. Mr. Horn has 6 cows and Pat and his father do the milking by hand.

Brown Belle is Pat's favorite cow. She never moves her foot when he is milking her.

Pat kept count of the gallons of milk that he and his father got from the cows in 3 milkings. He wants to know how much 8 gal. + 7 gal. + 9 gal. equal.

1. Add:

$$\begin{array}{r}8\\7\\+9\\\hline\end{array}$$

Will he find more than 2 tens? less than 3 tens? $8 + 7 = 8 + 2 + 5 = 10 + 5 = 15$.

Now he has $15 + 9 = ?$. It is a hidden combination. He must remember the 15 because he does not see it; $15 + 5 = 20$; $20 + 4 = 24$. Why?

When Pat added $8 + 7 + 9$, he saw that each time he added he passed a ten. First he passed 10 in $8 + 7$ to make 15. Then in $15 + 9$, he passed 20 to make 24.

"When I go from 10 to 20, it is just like crossing the bridge on the way to get the cows. When I get exactly 10 or 20, I am in the middle; then adding more ones takes me over it."

2. Add:	**a.**	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**	**j.**
	8	4	6	3	7	9	9	5	2	6
	5	6	9	9	3	5	4	6	9	7
	6	7	9	7	4	6	5	2	8	4

Meaning of Bridging in Addition

Addition Is Used on a Farm

Pat and his father carry the pails of milk to the milk house where the cream and skim-milk are separated by a machine. The cream comes out of one of the spouts, and the skim milk comes out of the other spout. They keep some of the milk out and use it to drink.

Pat filled two 10-gallon cans with skim milk and put 9 gallons in another can. He wanted to find how much skim milk there was in all. He said to himself, "When I add 10 and 10, I go from the middle of one bridge (10) to the middle of the next one (20). Then when I add 20 + 9, I go over to 29. I really have **bridged** two 10's."

$$\boxed{\begin{array}{r}10\\10\\+9\\\hline\end{array}}$$

1. Early one morning, Pat and his father took 15 gallons of whole milk and 19 gallons of skim milk out to the road for the Smith's milk truck to pick up. How many gallons in all did they sell that morning?

2. Jim Smith told Pat that his father sold 5 gallons of cream one day, 8 gallons the next day, 9 gallons the third day, and 6 gallons yesterday. How many gallons did he sell in all?

3. Brown Belle sometimes plays tricks on Pat. When he goes to the pasture to find her, she often hides from him. One evening it took him 19 minutes to find her. The next night he found her in 15 minutes. How much time did Pat spend looking for Brown Belle on both evenings?

4. Add:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
19	46	17	13	61	7	35	19
6	36	44	58	12	39	7	16
13	14	15	18	8	13	17	23

Bridging in Ones Column

Checking Your Skills

Fill in the blanks to show how you would use parts of a number to go from one ten to another ten (bridging tens). First decide on how many tens you should get:

8	6	7	2	6
9 ? ?	7 ? ?	7 ? ?	9 ? ?	9 ? ?
6 ? ?	8 ? ?	3 ? ?	8 ? ?	6 ? ?

Make dots like those you see here to show what parts you can use in the numbers 6, 9, and 7.

8 = 4 + 4 ●●●● ●●●● 8 = 1 + 7 ● ●●●●●●●

Bridging the tens:

a. When we have more than 9, we go into the *teens* numbers (six*teen*, eigh*teen*).

b. When we have more than 19, we go into the ?.

c. If we have more than 29, we cross or bridge into ?.

d. By having more than 59, we cross or bridge into ?.

1. 8 First, you will bridge
9 ten in 8 + 9 to make
+ 3 ?. Then, ? + ?
? = ?.

2. 6 First, you will bridge ?
8 to make ?. Then, ?
+ 9 + 9 will bridge ? to
? make ?.

3. Add, telling which tens you must bridge in the ones column:

a.	b.	c.	d.	e.	f.	g.	h.
7	8	20	15	16	14	18	16
9	8	9	9	26	14	19	12
15	28	8	18	10	14	20	15

Practice in Bridging

Feeding the Pigs

Every spring when the pigs are born, Father lets John and Ann pick out a pig for their very own. John calls his pig Curly.

Blackie is Ann's pig. He comes running when Ann calls him, because he wants his back scratched. Ann uses a corncob to scratch his back and between his ears.

1. Ann feeds all of the pigs every morning and night. This morning she fed the pigs 16 ears of corn, and this evening she fed them 27 ears. How many ears of corn did she give them today?

2. John carried 4 gallons of skim milk to the pigs in one pail. In another pail he carried 7 gallons. This noon he carried 8 gallons in one pail and 6 gallons in the other. The pigs got ? gallons of skim milk in all.

3. John and Ann go to the cornfield and cut the cornstalks for the pigs. John cuts them and hands them to Ann. He gave her 4, then 8, 9, and 3 all for one armful. How many stalks did he give her altogether?

4. The children carried other armfuls of corn stalks to the pigs. John carried 38, and Ann carried 26. How many did John and Ann carry in all?

5. Curly weighs 45 pounds. Blackie weighs 49 pounds. John said, "Together these pigs weigh ? pounds."

Problem Solving

The Old Apple Tree

After school some of the children went down to the apple tree by the creek. There were 26 apples on the tree. If each of the 5 children takes 3 apiece, how many apples will be left?

a. Are you sure you understand the problem? (It will help you if you draw a simple picture to illustrate the problem.)

b. What does the problem want you to find?

c. What facts are given to you to work with?

d. What do you have to do to find the answer? (Add, subtract, multiply, or divide?)

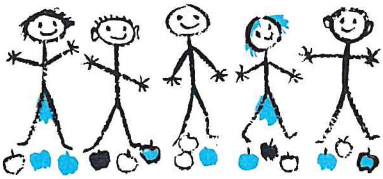
e. About how much will the answer be?

f. Do the work.

g. Check the answer.

1. Do the problem, using the helps given above:

MY PICTURE



a. Five of us each pick 3 apples. There are still some apples on the tree.

b. You want to know how many apples are left on the tree. What must you know before you can find how many apples are left?

c. There are ? children and they each take ? apples. There were ? apples on the tree before the children took any.

d. The first part of this problem is finding how many apples the children took. Can you find this by adding? multiplying?

e. About how many apples did they take? About how many will be left on the tree?

f. Use as many ways as you can to solve the problem.

g. Check your answer.

Two-Step Problems

An Apple a Day

1. Five of the boys went over to see Grandpa Cone. They helped him pick his apples. There were 51 apples in all.

Grandpa Cone said, "I will give you a few to take home. There are 51 apples. Each of you 5 boys may take 6 apples apiece. How many will that leave for me?"

a. Pretend that you give 6 apples to each of 5 boys, then draw a picture to show this.

b. What do you want to know?

c. There are ? apples in all. Each of the ? boys takes ? apples.

d. How can you get the first part of the problem? How would you do the second part?

e. About how many apples will the 5 boys take in all? About how many will be left for Grandpa Cone?

f. Can you add to find how many apples the boys will take? Can you multiply to find this? Can you think of another way to do it?

g. How will you find how many apples are left?

h. Check the answer.

2. Grandpa Cone gave 2 carrots to each of the 5 boys, and 8 to his rabbits. How many carrots are left out of 2 dozen?

3. Grandpa made a large bouquet for Ann on her ninth birthday. He used 8 asters, 7 daisies, and 6 roses. Then he added $\frac{1}{2}$ of the 14 lilies that were in bloom. How many flowers were in the bouquet?

4. Grandpa fixed a basket full of vegetables for a friend of his. He put in $\frac{1}{3}$ of the 24 turnips he had, 4 carrots, 8 tomatoes, and 5 parsnips. How many vegetables were in the basket?

Practice with Two-Step Problems

Taking Care of Curly and Blackie

1. One Saturday, John and Ann made several trips carrying water to the pigpen. They wanted to make a mudhole for the pigs. John carried 8 gallons, 7 gallons, 4 gallons, and 6 gallons. Ann carried 6 gallons, 5 gallons, and 5 gallons. How many gallons of water did they carry altogether?

First, put down the gallons that John carried on each trip; then put down the gallons that Ann carried. Tell the hidden combinations as you add.

a. 8 gal.
7 gal. 2 and ?
4 gal.
6 gal. ? and ?

b. 6 gal.
5 gal. ? and ?
5 gal.

c. John carried ? gal.
Ann carried ? gal.
Together
they carried ? gal.

2. Ann feeds Blackie carrots from her garden so that his coat will shine. She fed him this many: 7, 8, 9, 8, 4. How many carrots did Blackie eat in all?

3. Curly eats "like a pig." He ate 7 ears of corn for breakfast and 6 ears for supper. John could have sold this corn for 6¢ an ear.

a. How many ears did Curly eat all day?

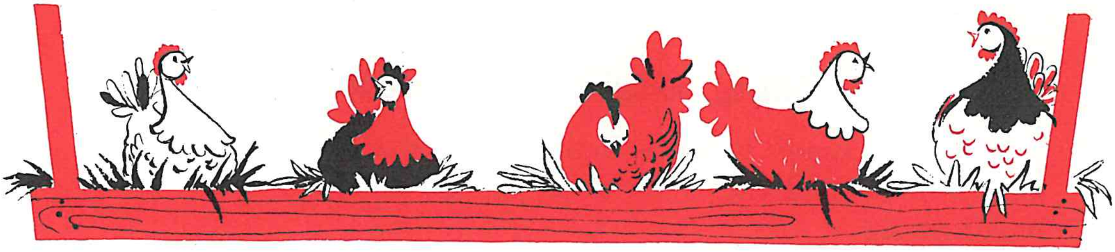
b. Find how much money the corn was worth that Curly ate today.

4. Curly and Blackie drank 16 gallons of skim milk last week, 4 gallons yesterday, and 7 gallons today. How many gallons did they drink in all?

5. Add these. Tell what ten you bridged:

a.	b.	c.	d.	e.	f.	g.	h.	i.
8	18	28	6	6	6	7	18	27
9	9	9	15	25	35	4	4	5

Seeing Bridging in Addition



Linda and Ann Gather Eggs

1. Linda helped her friend Ann gather eggs. They put just a few eggs in each pail so that they would not crack. They put 18 in one pail and 16 in the other. How many eggs were there in both pails together? How many dozen were there? Were there any eggs left over besides the full dozens?

2. In one row of nests the girls found 8 eggs. They found 5 eggs in the next row of nests, 7 in the next row, and 4 in the bottom row.

a. How many eggs did they find in all?

b. How many boxes could they fill if each box holds 1 dozen?

3. The girls decided to gather feathers in the chicken yard for an Indian play at school. One day they found 6 feathers. The next day they found 8. The last day they found 5. How many feathers did they find altogether?

4. Linda counted 28 red hens, 27 white ones, 16 gray-and-white ones, 12 yellow ones, and 10 black ones. How many hens were there altogether?

5. This is the number of quarts of oats that Ann fed the chickens: Monday, 5 quarts; Tuesday, 6 quarts; Wednesday, 5 quarts; Thursday, 6 quarts; Friday, 8 quarts. Ann fed ? quarts of oats in all to the chickens.

6. Ann put the eggs for the week into a crate to take into town on Saturday. There were 26, 27, 15, 18, and 11 eggs. How many in all did she put in the crate?

Using Endings in Addition

You know many number facts in addition. You also know how to find the facts which you do not know by building tens.

Let's add this exercise:

9
8 1–7
7 3–4
+8 6–2

Will the answer be as much as 4 tens? More than 3 tens?

$9 + 8 =$? You see that you must bridge and get a teens number (seventeen). $9 + 8 = 9 + 1 + 7 = 10 + 7 = 17$. The ending here is 7.

$17 + 7$ will bridge into a 20's number. Why?

$17 + 7 = 17 + 3 + 4 = 20 + 4 = 24$.

Now $24 + 8 =$?. It will be a 30's number. Why?

1. Add. Remember the endings as you bridge the tens:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
7	8	6	5	7	7	6	5	4
7	3	9	6	9	3	5	4	8
6	9	9	4	6	7	5	7	9
3	4	6	7	4	7	8	6	2

2.	34	46	78	18	60	34	35
	19	14	12	37	18	14	19
	16	28	6	16	15	17	18

3. Bill and Joe milk cows every morning and night. Bill got 4 gallons from one cow, 2 gallons from another cow, and 9 gallons from all the other cows. How many gallons of milk did Bill get in all?

4. Joe got 3 gallons from one cow, and 8 gallons from the other cows he milked. How many gallons did he get from the cows he milked?

5. How many gallons of milk did both boys get?

Making Cookies

Ann and Linda are making cookies. John has cracked the nuts. They will take some of the cookies to the men who are husking corn. They will take some of them to school in their lunches.

1. Ann used 4 cookie pans. She baked 12, 18, 16, and 17 cookies at once in the 4 pans. How many cookies did she bake at the same time?

2. Linda used a cookie cutter to make 8 ducks, 6 hens, 8 roosters, and 7 geese. Did she have 2 dozen? If not, how many more or less than 2 dozen did she have?

3. The girls decided to put colored sugar on some of the cookies. They put green sugar on 14 cookies, red sugar on 18, yellow on 16, and blue on 14. How many cookies have colored sugar on them?

4. They dipped the date bars in powdered sugar. They dipped 2 dozen and 4 more. How many date bars did they dip in sugar?

5. John cracked 14 walnuts, 19 pecans, and 28 almonds. Find how many nuts he cracked in all.

6. Ann put 23 cookies into one cookie jar, and 29 into another jar, and 15 into a third jar. How many cookies did she put away altogether?

Addition — Bridging

How Well Have You Learned?

1. Use the blanks to show what parts you use to help you add. Think how many tens you should get, then find the answers:

8	6	4	9	7
7 ? ?	9 ? ?	8 ? ?	8 ? ?	6 ? ?
7 ? ?	5	6	8 ? ?	9 ? ?

2. Tell how many tens and how many ones in each of these (don't forget to change ones to tens where you can):

a.

1

39 = ? tens and ? ones

+ 48 = ? tens and ? ones

87 ? tens and ? ones

b.

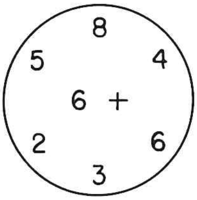
1

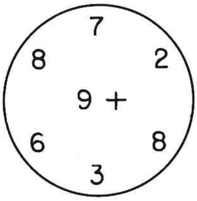
18 = ? tens and ? ones

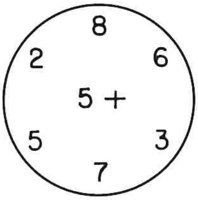
+ 35 = ? tens and ? ones

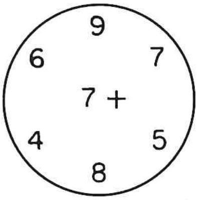
53 ? tens and ? ones

3. Do you know these at first sight?









4. First, read this problem, and then tell what you must do to find the answer:

Mary put 18 eggs into one pail and 18 eggs into another pail. Mary's mother can sell these eggs for 50¢ a dozen. How much are the eggs worth?

5. Add:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
8	6	9	4	4	3	6	7
9	4	8	5	7	5	9	8
4	6	3	5	7	4	5	7
2	6	4	7	4	8	3	3
23	22	24	21	22	20	23	25

Practice in Adding

Tips to help you:

Remember: you are building tens.

$$\begin{array}{r} 3 \\ +7 \\ \hline 10 \end{array} \qquad \begin{array}{r} 13 \\ +7 \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ +7 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ +6 \\ \hline \end{array} \qquad \begin{array}{r} 14 \\ +6 \\ \hline \end{array} \qquad \begin{array}{r} 24 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +6 \\ \hline 15 \end{array} \qquad \begin{array}{r} 9 \\ +9 \\ \hline 18 \end{array} \qquad \begin{array}{r} 9 \\ +8 \\ \hline 17 \end{array}$$

(9 + any number is 10, + one less than this number. Why?)

$$\begin{array}{r} 11 \\ +4 \\ \hline 15 \end{array} \qquad \begin{array}{r} 11 \\ +7 \\ \hline 18 \end{array} \qquad \begin{array}{r} 11 \\ +5 \\ \hline 16 \end{array}$$

(11 + any number is one more than 10, + this number. Why?)

Ten + any ones number is easy to remember. Tell why.

$$\begin{array}{r} 10 \\ +6 \\ \hline 16 \end{array} \qquad \begin{array}{r} 10 \\ +9 \\ \hline 19 \end{array} \qquad \begin{array}{r} 10 \\ +4 \\ \hline 14 \end{array}$$

1. Add (tell the hidden combinations in adding ones):

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
8	28	18	3	9	24	10	16
6	14	30	7	8	6	9	9
3	17	39	8	6	18	6	15

2. Pat and his brothers and sisters go to town every Saturday night with their mother and father. It is 7 miles into town. It is 4 miles farther out to the nursery where they want to buy some tomato plants. Then it is one mile still farther on to the feed store where they want to get some chicken mash. How far will they have to drive to go to all these places and back again?

3. When all the shopping was done, Pat's father took the family into the drugstore for a treat. Here is his bill:

Cherry sundae	$.20	Chocolate sundae	$.20
Dish of ice cream	$.15	Cup of chocolate	$.12

How much did Pat's father pay for all of the treats?

Playing Hide and Seek

Farm children like to play hide and seek. When Joe's friends come to his house, they always play this game.

In the picture, you see Joe hiding his face. He has to count to one hundred before he can look for the children. This gives the children time to hide before he has to find them. He is supposed to count by ones, but one time Joe fooled his friends. He counted by saying, "ten, ten, double ten, forty-five and fifteen. That's a hundred."

You know the number 99. Its number name is ninety-nine. Why does the name tell you that there are 90 ones and 9 ones? Does this picture tell you that there are 90 ones and 9 ones in 99? Why?

99

~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~	IIIIIIIII
9 groups of 10 ones	9 ones

If you add 1 to 99, how many will you have?

Hundreds	Tens	Ones
		~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ ~~IIIIIIIIII~~ IIIIIIIIII 9 groups of 10 ones 10 ones
	□□□□□□□□□□ 10 tens	
□ 1 hundred		

Do you see the changes that were made here? 10 groups of 10 ones = 10 tens. Then 10 tens were changed to a larger counter. We call this the *hundreds* counter.

1 hundred	0 tens	0 ones	= 100

Hundreds place is always on the left of tens place.

Reading and Writing Hundreds

Suppose we have 3 hundreds, 4 tens and no single ones. Do you see that the counters and figures are correct? Tell why.

Hundreds	Tens	Ones
□ □ □	▯▯▯▯	
3	4	0

1. Tell how many hundreds, tens, and ones there are in these boxes. Then write the numbers for them:

Hundreds	Tens	Ones
□ □	▯ ▯	

Hundreds	Tens	Ones
□		IIIIII

2. Make pictures with counters to show the meanings in hundreds, tens, and ones for these numbers:

126, 108, 200, 324, 150, 192, 111, 222

3. Fill the blanks:

a. 123 = ? hundreds, ? tens, and ? ones.
b. 150 = ? hundreds, ? tens, and ? ones.

4. We read numbers like 284 by saying, "Two hundred eighty-four." Read these numbers:

156, 299, 464, 320, 285, 961, 222, 459

5. Write these as numbers:

a. Six hundred seventy-two (672)
b. Seven hundred eighty
c. Two hundred thirty-four
d. Five hundred six
e. Four hundred fifty
f. Nine hundred eight

Do you see that you do not say the word "and" between the hundreds and the other values? "Two hundred and eleven" would not be correct for 211.

The Meanings in Hundreds

You know that 1 hundred ones = 10 tens = 100 ones. Tell why these are correct:

125 = 125 ones
125 = 1 hundred, 2 tens, and 5 ones
125 = 12 tens and 5 ones
125 = 1 hundred and 25 ones
125 = 10 tens and 25 ones

125 = 11 tens and 15 ones

263 = 263 ones
263 = 2 hundreds, 6 tens, and 3 ones
263 = 26 tens and 3 ones
263 = 2 hundreds and 63 ones
263 = 1 hundred, 16 tens, and 3 ones
263 = 25 tens and 13 ones

Let's add some two-place numbers:

$$\begin{array}{r} 10 \\ 10 \\ 20 \\ 45 \\ +\ 15 \\ \hline \end{array}$$

Add the ones: 5 + 5 = 10. Write 0 in ones place and hold the 1 ten.

Add the tens: 1 + 1 + 2 + 4 + 1 + 1 (held from the ones) = 10.

We have 10 tens = 1 hundred. Why?

Write 0 in tens place and 1 in hundreds place in the answer.

$$\begin{array}{r} 46 \\ +\ 84 \\ \hline 130 \end{array}$$

6 + 4 = 10. How many tens do we hold? 4 tens + 8 tens + 1 ten = 13 tens. How many hundreds and how many tens in 13 tens? Prove this with counters.

Add:

	a.	b.	c.	d.	e.	f.	g.	h.
1.	54 68	86 39	65 49	24 87	46 58	44 76	37 91	55 45
2.	35 42 59	37 68 79	85 99 67	56 57 58	73 18 66	77 44 33	89 8 60	50 60 70

Adding Hundreds

Add:

$$\begin{array}{r}176\\ \underline{235}\\ 1\end{array}$$

$$\begin{array}{r}176\\ \underline{235}\\ 11\end{array}$$

$$\begin{array}{r}176\\ \underline{235}\\ 411\end{array}$$

Let's see how you would add hundreds when you have parts with more than 9 ones and 9 tens. Will the answer be as much as 4 hundreds? Why? Add the ones. 6 ones and 5 ones are 11 ones. Write ? in ones place in the answer. Hold the 1 ten to add with the other tens.

Add the tens. 7 tens and 3 tens are 10 tens; 10 tens and the 1 ten you held from 11 ones are 11 tens.

11 tens are 1 hundred and 1 ten. Write the 1 in tens place in the answer. Hold the 1 hundred.

Add the hundreds. 1 hundred and 2 hundreds are 3 hundreds; 3 hundreds and the 1 hundred you held are 4 hundreds. Write 4 in hundreds place in the answer.

Add:

$$\begin{array}{r}537\\ \underline{187}\end{array}$$

The answer will be more than 700. Why? Add the ones. How many tens can you make from 14 ones? How many tens do you hold? What do you write in ones place?

Add the tens and the ten you held. How many tens are there in all? Ten tens are 100, so how many hundreds can you make from the number of tens you found?

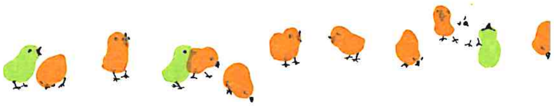
Add the hundreds. What is your answer?

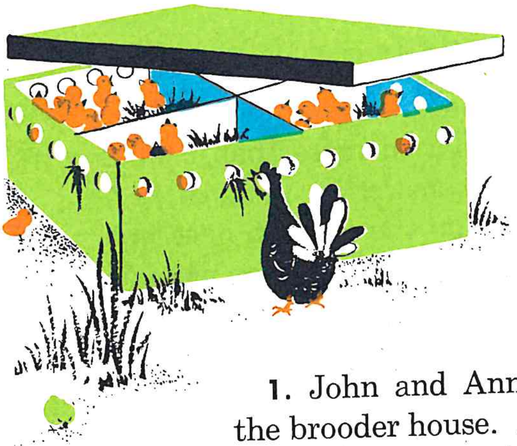
1. Write these in figures:

a. five hundred sixty-two
b. one hundred eleven
c. two hundred six
d. three hundred seventy-eight

2. Write these numbers in words:

a. 128 **b.** 570 **c.** 801 **d.** 400 **e.** 135





Baby Chicks

John and Ann could hear the peeping when they turned into the road leading to their farmhouse. They knew the baby chicks had arrived from the hatchery.

1. John and Ann counted 75 chicks in one corner of the brooder house. Another 36 chicks were running about in the other part of the brooder house. How many chicks were there altogether?

2. John's father brought in two more boxes of chicks. The children counted 56 chicks in one box and 68 in the other box. How many chicks were there in the two boxes?

3. John and Ann went into the other brooder house. They counted 146 chicks on the floor and another 26 chicks that had hopped back into the boxes in which they had been brought from the hatchery. How many chicks are in this brooder house?

4. John's father brought in another box with 63 chicks in it to add to the chicks that were already in the brooder house. Find how many chicks there are altogether.

5. John held the door of the granary while his father unloaded the sacks of chick mash. One sack held 50 pounds of mash, two sacks each held 100 pounds, and two more sacks each held 75 pounds. How many pounds of mash did John's father unload?

6. Add:

a.	b.	c.	d.	e.	f.	g.	h.
134	165	312	198	216	487	176	188
615	318	414	186	313	156	409	144

Ben Is a Gardener

Ben's garden plot is down by the creek. He asked his father to plow the ground for him.

When April came and it was time to do the planting, Ben raked the ground until it was "as fine as flour," then he planted the seeds.

There were carrots, beets, lettuce, onions, cabbages, and tomatoes in his garden.

1. If Ben had bought a package of carrot seeds for 10¢, one of beet seeds for 12¢, and one of lettuce seeds for 8¢, what did they cost him altogether?

2. Ben bought 3 dozen onion sets. A dozen of one kind cost 18¢, a dozen of another kind cost 24¢, and the third dozen cost 20¢. What was the total cost of the onion sets?

3. Tomatoes are Ben's best sellers at his roadside stand, so he put out 4 dozen plants. The plants cost him as follows:

YELLOW	RED
1 doz., small size — 27¢ a doz.	1 doz., medium size — 18¢ a doz.
1 doz., large size — 23¢ a doz.	1 doz., large size — 22¢ a doz.

What did the plants cost Ben?

4. Ben bought one and one-half dozen red cabbage plants for 33¢ and two dozen green cabbage plants for 38¢. How much did he spend for cabbage plants?

Vegetables for Sale

Susan's garden is next to her brother's garden. She raises vegetables and flowers.

1. Susan picked 3 pounds of peas and 2 bunches of flowers and sold them. If she got 48¢ for the peas and 32¢ for the flowers, what amount did she receive in all?

2. Susan sold 5 large cucumbers for 9¢ each and 10 medium sized ones for 4¢ each. How much money did she get for the cucumbers?

3. Ben and Susan sold 8 boxes of large white onions, 12 boxes of small white ones, and 15 boxes of yellow ones. How many boxes of onions did they sell that day?

4. Susan sold one large head of cabbage for 17¢, a box of tomatoes for 25¢, and a basket of cucumbers for 28¢. Find how much money she received in all.

5. One day Susan received $.25 for a box of tomatoes and $.65 for some peas and carrots. How much money did she receive in all?

6. Add:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
38¢	57¢	45¢	60¢	78¢	47¢	32¢	66¢
46¢	29¢	35¢	30¢	20¢	26¢	48¢	26¢

Problems and Exercises

John Makes a New Gate

Reddy is John's pet calf. Reddy always thinks the grass is greener on the other side of the fence. There is a lot of green grass in the pasture, but Reddy puts his head through the fence and eats the grass on the other side. Today Reddy broke the gate when he put his head through it. John is going to make a new gate.

John found a board 36 inches long. He wants to know if this board is long enough to give him one piece 16 inches long and two pieces 10 inches long. Is the board long enough?

John also wants to know how long a board he will need to have one piece that is 1 foot and 8 inches long and another piece that is 1 foot and 9 inches long.

One way John can find this is to change both measurements to inches and add them:

1 foot and 8 inches = 12 inches + 8 inches.
Find how many inches there are in both pieces.

$$\begin{array}{r} 20 \\ +\ 21 \\ \hline \end{array} \quad \text{Why?}$$

One way by which John can find how long both pieces are is to add this way:

$$\begin{array}{r} 1 \text{ foot and } 8 \text{ inches} \\ +\ 1 \text{ foot and } 9 \text{ inches} \\ \hline 2 \text{ feet and } 17 \text{ inches} \\ \text{or} \\ 3 \text{ feet and } 5 \text{ inches} \end{array}$$

Add the inches first. 8 inches + 9 inches = 17 inches. 17 inches = 1 foot and 5 inches. Prove this by using a ruler.

You can add the foot to the feet you have. You will have 3 feet and 5 inches.

Add:

1.	1 foot and 6 inches 1 foot and 7 inches	2 feet and 3 inches 1 foot and 7 inches	1 foot and 1 inch 2 feet and 7 inches
2.	3 feet and 9 inches 2 feet and 9 inches	1 foot and 8 inches 3 feet and 7 inches	2 feet and 6 inches 2 feet and 8 inches

Adding Feet and Inches

The Church Bazaar

John and Ann went to a church bazaar with their family. Their mother brought fried chicken for dinner. Some of the ladies brought home-made ice cream. The dinner will cost 85¢. Ann's 4-H Club made aprons for the bazaar. There are quilts, pillow cases, and stuffed toys for sale.

1. Each member of Ann's family ate a dish of home-made ice cream. The ice cream cost 9¢ a dish. There are 6 in the family. What did their ice cream cost?

If you add

$$\begin{array}{r} 9¢ \\ 9¢ \\ 9¢ \\ 9¢ \\ 9¢ \\ +\,9¢ \\ \hline \end{array}$$

Remember the endings as you add. Also, tell the hidden combinations.

If you multiply

$$\begin{array}{r} 9¢ \\ \times\,6 \\ \hline ?¢ \end{array}$$

2. Ann bought 3 stuffed monkeys to give for Christmas toys. Each cost 19¢. How much did they cost altogether? Could you use 3 × 19¢ if you knew how to do it? Why?

$$\begin{array}{r} 19¢ \\ 19¢ \\ +\,19¢ \\ \hline \end{array}$$

3. John bought 2 pairs of fancy pot holders for his aunts. Each pair cost 35¢. Find the total cost.

$$\begin{array}{r} 35¢ \\ +\,35¢ \\ \hline \end{array}$$

4. Bobby bought a balloon for himself and each of his three brothers and sisters. Each balloon cost 7¢. Find how much he paid for the balloons.

Problem Solving

The County Fair

John and Ann can hardly wait for the County Fair. Both of them belong to the 4-H Club. John is taking Curly, and Ann is taking Blackie. They hope their pigs win a prize.

1. There were 3 pigs in one pen, Blackie and Curly in another, and 6 pigs in a pen next to them. How many pigs were in the 3 pens?

2. John bought candy for a dime, a hamburger for 15¢, and a cold drink for 8¢. How much did he spend?

3. John threw balls at some wooden pins standing on a table. He spent 15¢ two different times and 35¢ another time trying to knock the pins off. How much did he spend in throwing balls at the pins?

4. Ann rode the merry-go-round 6 times. The tickets were 8¢ each. To find how much the tickets cost, would you add or multiply? How much is 6 × 8¢? Check by addition.

5. Ann saw 3 of her friends at the flower show, 15 of her other friends at the 4-H Building, and 18 other friends at the Livestock Building. How many of her friends did she see at the Fair?

Problems for Review

Unit Review

1. You should be able to add these quickly:

a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
4	8	7	6	9	5	8	7	5	4
3	6	5	9	9	5	9	9	8	6
5	7	6	9	8	6	4	9	8	7
7	4	7	3	7	4	7	7	4	7
8	6	7	5	4	6	9	5	6	7
3	5	6	9	5	3	6	4	7	3

2. Add:

26	27	12	38	34	10	58	66	34	15
29	38	19	19	48	36	17	17	36	19
36	21	37	26	29	45	26	28	19	68
6	18	21	25	27	39	9	10	22	26
31	10	6	18	18	19	26	21	18	19
27	41	12	37	49	25	34	46	37	29

3. Add:

21¢	37¢	35¢	80¢	41¢	34¢	23¢	5¢	81¢	7¢
76¢	59¢	49¢	16¢	37¢	8¢	47¢	69¢	9¢	71¢

4. Add by building tens:

7	9	7	7	6	8	8	7	3	6
5	4	9	7	9	8	6	8	9	8
5	2	2	9	8	6	7	9	7	5
6	7	4	6	1	2	0	3	1	9

5. What does "bridging tens" mean in addition?

6. Which ten are you bridging in 7 + 5? in 17 + 5? What was the ending in each case?

Unit Test

1. Add by building tens (tell where you bridge a ten):

a.	b.	c.	d.	e.	f.	g.	h.	i.
38	72	65	$.25	$.09	12	47	110	118
27	17	17	.34	.13	6	16	437	156
18	8	17	.19	.56	9	25	145	244

2. Add. Remember the endings when you bridge a ten:

19	9	9	9	8	48	8	66	38
18	5	17	17	19	24	8	18	16
14	6	4	6	7	33	7	33	59

3. Why are you bridging when you say 17 and 6 are 23?

4. Pat gets 9 quarts of milk from Brown Belle every day. How many quarts does she give in a week? (Find the answer two ways.)

5. Mr. Smith has 87 chickens. If he should buy 12 more, how many would he have in all?

6. Add these. You can use multiplication to help you in some of the exercises:

8	9	7	5	8	9	6	4	9
8	9	7	5	8	9	6	4	9
8	3	7	5	4	9	6	4	7
8	6	7	6	6	9	7	6	7
2	1	2	4	7	9	5	3	5

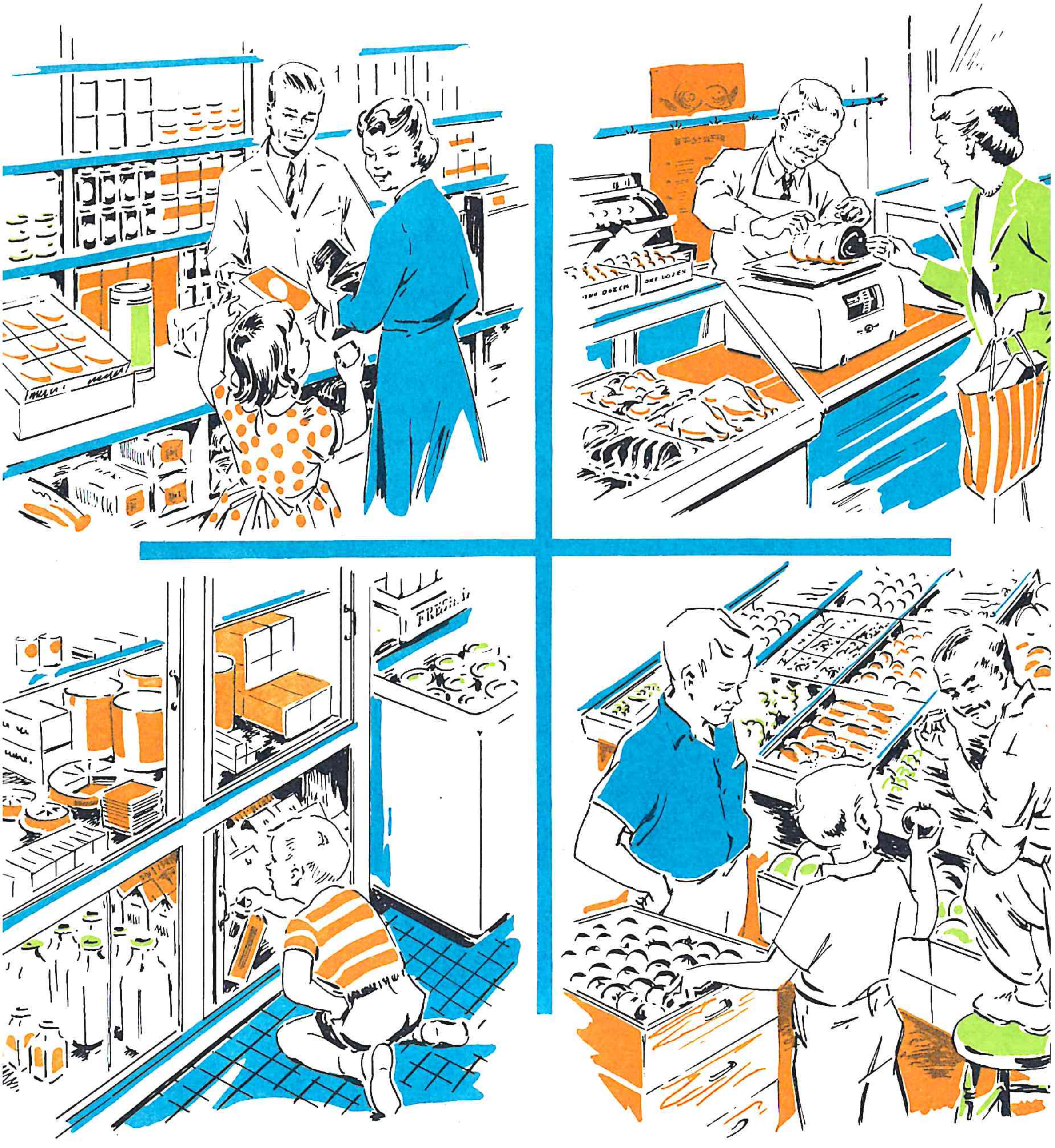
7. Tell the places in these numbers by putting them in a box like this one. Then add them.

129
27
217

Hundreds	Tens	Ones

UNIT 5

Foods for Your Table



People on farms and ranches raise many of the foods you eat. After the food is raised in the country, it is brought to towns and cities where it is sold to people in grocery stores, butcher shops, dairy stores, and other places.

Chickens are taken from farms into towns and cities and sold to storekeepers. In what different kinds of stores can you buy chickens?

Do you know how milk gets from the farm to your table? Did you know that cheese, cottage cheese, and canned milk are made from milk such as you buy by the quart?

Animals for food (like pigs, sheep, and cattle) are sent to the stockyards. Some of the animals are butchered there, and the meat is then sent to the stores and meat markets.

You might like to go along with Ben and his father as they take vegetables to the wholesale market. The wholesaler buys the vegetables from the farmer and then sells them to the grocery stores where you can buy them. What vegetables are sold in stores?

1. What use do you make of numbers when you go to the butcher shop to buy meat?

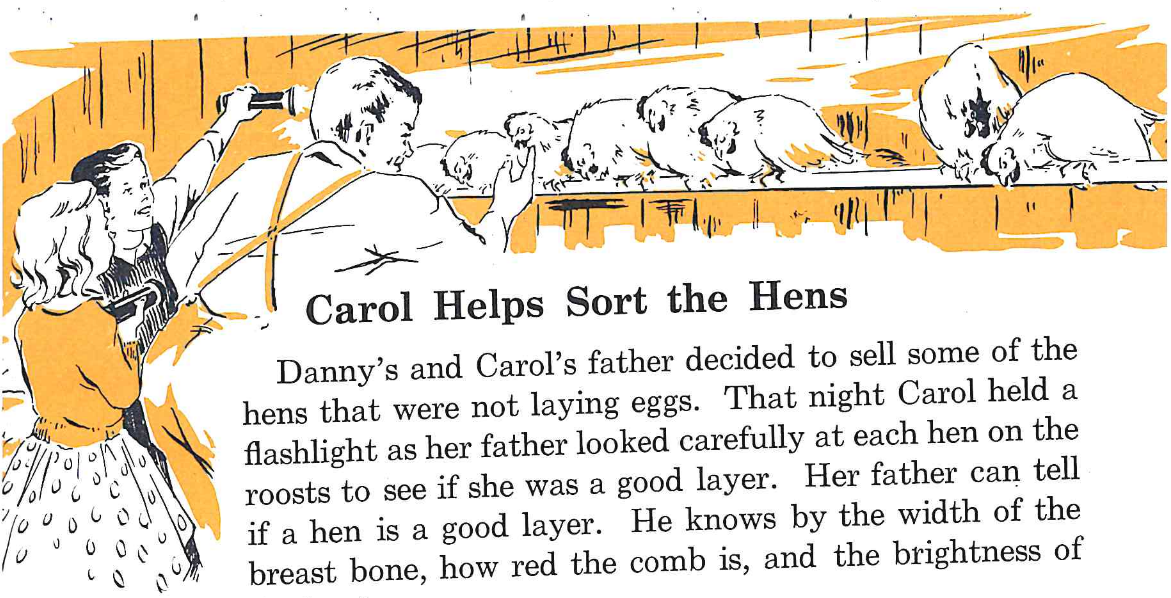
2. If you sell some of your vegetables from the garden to a wholesaler, how do you use numbers?

3. Can you count change? How could you be sure you received the right amount of change?

4. Choose one of the pictures on the opposite page and tell why you might subtract if you were doing the work.

5. Did you ever go to a store that sold chicken parts? What is your favorite part of the chicken?

6. Did you ever go to a fried chicken supper? How many pieces of chicken do you think you could eat?



Carol Helps Sort the Hens

Danny's and Carol's father decided to sell some of the hens that were not laying eggs. That night Carol held a flashlight as her father looked carefully at each hen on the roosts to see if she was a good layer. Her father can tell if a hen is a good layer. He knows by the width of the breast bone, how red the comb is, and the brightness of the hen's eyes.

There were 78 hens at first. If 24 of them were sold because they were not good layers, how many were left? Were there as many as 50 hens left? Why?

$$\boxed{\begin{array}{r} 78 \\ -\ 24 \\ \hline ? \end{array}}$$

$$\begin{array}{r} 78 \\ -\ 24 \\ \hline \end{array} = \begin{array}{r} \text{7 tens and 8 ones} \\ -\ \text{2 tens and 4 ones} \\ \hline \end{array}$$

Subtract the ones first.
Subtract the tens next.

Now do it without writing the tens and ones.

$$\begin{array}{r} 78 \\ -\ 24 \\ \hline 54 \end{array}$$

You can think: 4 ones from 8 ones = 4 ones. Write 4 in ones place in the answer. Then 2 tens from 7 tens = 5 tens. Write the 5 in tens place in the answer. 54 hens were left.

1. Subtract, writing the tens and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**	**j.**
68	56	89	76	47	59	68	54	77	43
24	35	34	43	13	33	46	11	35	31

2. Subtract, thinking the tens and ones:

85	37	91	66	98	72	86	57	99	25
33	21	70	24	45	41	31	22	45	12

How Good Is Your Thinking?

A lady went into a store and bought 9 drumsticks. There were 26 drumsticks in the case when she came in. How many were left? Why were there less than 20 left?

$$\boxed{\begin{array}{r} 26 \\ -\ 9 \\ \hline \end{array}}$$

$$\boxed{\begin{array}{r} 26 \\ -\ 9 \\ \hline \end{array}}$$

You want to take 9 ones from 6 ones. What should you do? You can change one of the 2 tens into 10 ones. If you put these 10 ones with the 6 ones you already have, you will have 16 ones. You will have 1 ten left in tens place.

$$\boxed{\begin{array}{rl} & \square\ \square\ \text{||||||} \\ - & \text{|||||||||} \\ \hline \end{array} \quad = \quad \begin{array}{rl} & \square\ \text{||||||||||||||||} \\ - & \text{|||||||||} \\ \hline \end{array}}$$

Let's see what you have done:

$$\begin{array}{r} 26 \\ -\ 9 \\ \hline \end{array} = \begin{array}{lr} & 2 \text{ tens and } 6 \text{ ones} \\ - & 9 \text{ ones} \\ \hline \end{array} = \begin{array}{lr} & 1 \text{ ten and } 16 \text{ ones} \\ - & 9 \text{ ones} \\ \hline \end{array} \qquad \begin{array}{r} \overset{1}{\cancel{2}}\overset{10}{6} \\ -\ 9 \\ \hline \end{array}$$

Did you know at once that 9 ones from 16 ones = 7 ones? If not, change 16 ones to 10 ones + 6 ones. Then,

$$\begin{array}{r} \overset{1}{\cancel{2}}\overset{\overset{1}{\cancel{10}}}{6} \\ -\ 9 \\ \hline \end{array}$$

$$\begin{array}{l} 10 \text{ ones} + 6 \text{ ones} \\ -\ 9 \text{ ones} \\ \hline \end{array} = 1 \text{ one} + 6 \text{ ones} = 7 \text{ ones. Why?}$$

$$\begin{array}{r} 26 \\ -\ 9 \\ \hline 7 \end{array}$$

Write 7 in ones place in the answer.
There are no tens to subtract from 1 ten, so there will be 1 ten in the answer.

1. $$\begin{array}{r} 38 \\ -\ 9 \\ \hline \end{array} = \begin{array}{lr} & 3 \text{ tens and } 8 \text{ ones} \\ - & 9 \text{ ones} \\ \hline \end{array} = \begin{array}{lr} & 2 \text{ tens and } ? \text{ ones} \\ - & 9 \text{ ones} \\ \hline & ? \text{ and } ? \end{array} = ?$$

2. $$\begin{array}{r} 46 \\ -\ 8 \\ \hline \end{array} = \begin{array}{lr} & ? \text{ tens and } ? \text{ ones} \\ - & 8 \text{ ones} \\ \hline \end{array} = \begin{array}{lr} & ? \text{ tens and } ? \text{ ones} \\ - & 8 \text{ ones} \\ \hline & ? \text{ tens and } ? \text{ ones} \end{array} = ?$$

Seeing Parts of Numbers — Writing Tens and Ones in Subtraction

Do You Remember?

What is subtraction? It is finding how many we have left.

$$\begin{array}{r} 16 \\ -7 \\ \hline 9 \end{array}$$

Do you know this fact? Can you use parts of 10 to help you if you don't?

1. Use parts of 10 to help you find these facts:

$$\begin{array}{r} 18 \\ -9 \\ \hline \end{array} = \begin{array}{l} 10 + 8 \\ -9 \\ \hline \quad ? + 8 = ? \end{array} \qquad \begin{array}{r} 14 \\ -8 \\ \hline \end{array} = \begin{array}{l} 10 + 4 \\ -8 \\ \hline \quad ? + 4 = ? \end{array}$$

$$\begin{array}{r} 15 \\ -6 \\ \hline \end{array} = \begin{array}{l} 10 + 5 \\ -6 \\ \hline \quad ? + ? = ? \end{array} \qquad \begin{array}{r} 13 \\ -4 \\ \hline \end{array} = \begin{array}{l} 10 + 3 \\ -4 \\ \hline \quad ? + ? = ? \end{array}$$

2. Can we do this when we are finding how many are left in 14 – 5?

$$\begin{array}{r} 14 \\ -5 \\ \hline 9 \end{array}$$

We know that the whole is 14. We know that one of the parts of 14 is 5; we must find the other part. We can think: 5 and how many more are 14? We learned in addition that 5 and 9 are 14. This is called the *addition* way of doing a subtraction.

Think how many more to find these facts:

$$\begin{array}{r} 17 \\ -8 \\ \hline \end{array} \; 8 \text{ and } \; ? \; = 17 \qquad \begin{array}{r} 11 \\ -6 \\ \hline \end{array} \; 6 \text{ and } \; ? \; = 11$$

3. It is helpful to know as many subtraction facts as possible. Practice on these:

$$\begin{array}{r} 10 \\ -3 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -5 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ -6 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ -5 \\ \hline \end{array} \quad \begin{array}{r} 17 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -4 \\ \hline \end{array}$$

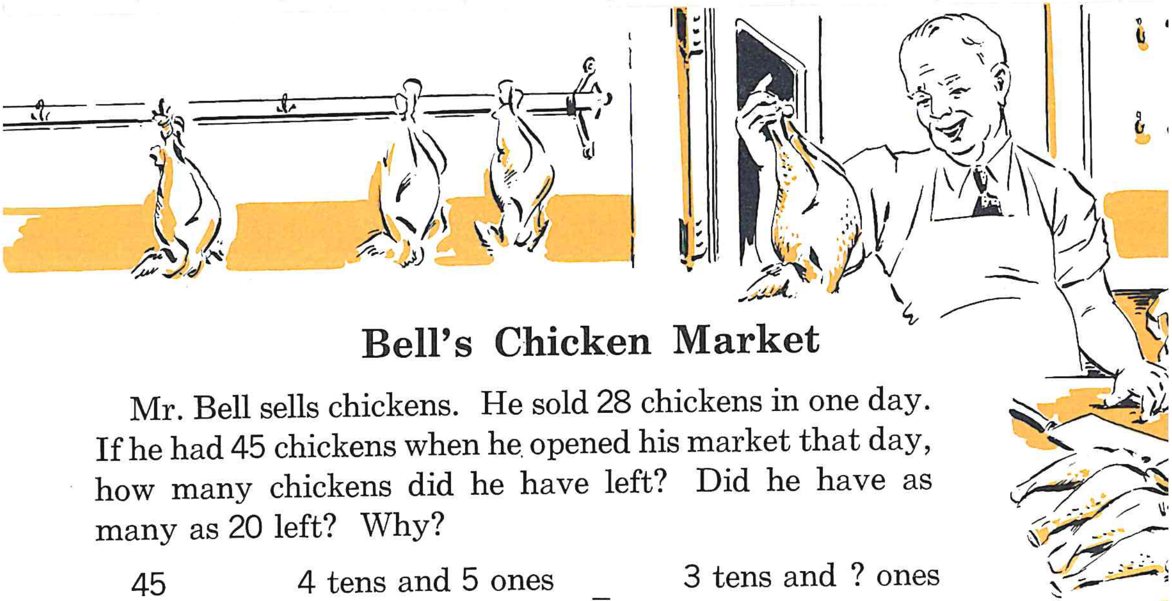
$$\begin{array}{r} 10 \\ -2 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -6 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ -5 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ -6 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ -8 \\ \hline \end{array}$$

Test on Subtraction Facts

Fold a piece of paper in strips and write the answers on the strips by rows. Check your answers with another pupil. Learn any that you do not know by using counters.

Subtract the following:

	a.	b.	c.	d.	e.	f.	g.	h.
1.	10 1	3 2	11 2	12 5	9 6	14 7	11 8	13 9
2.	4 3	9 1	4 2	11 4	13 5	10 6	15 7	14 8
3.	12 3	5 3	8 1	5 2	12 4	14 5	11 6	14 9
4.	6 5	5 4	6 3	7 1	6 2	13 4	12 6	16 7
5.	13 6	7 5	6 4	7 3	6 1	7 2	9 7	17 8
6.	8 7	14 6	8 5	7 4	8 3	15 9	8 2	10 7
7.	16 8	13 7	15 6	9 5	8 4	9 3	4 1	9 2
8.	9 8	15 8	12 7	8 6	10 5	9 4	10 3	3 1
9.	17 9	16 9	10 8	13 8	7 6	11 5	10 4	11 3



Bell's Chicken Market

Mr. Bell sells chickens. He sold 28 chickens in one day. If he had 45 chickens when he opened his market that day, how many chickens did he have left? Did he have as many as 20 left? Why?

$$\begin{array}{r} 45 \\ -\,28 \\ \hline \end{array} = \begin{array}{r} \text{4 tens and 5 ones} \\ -\ \text{2 tens and 8 ones} \\ \hline \end{array} = \begin{array}{r} \text{3 tens and ? ones} \\ -\ \text{2 tens and 8 ones} \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ -\,28 \\ \hline 17 \end{array} = \begin{array}{r} \text{3 tens and 15 ones} \\ -\ \text{2 tens and 8 ones} \\ \hline \text{1 ten and 7 ones} \end{array} = 17$$

You changed 1 ten to 10 ones.

This is the way to think tens and ones:

$$\begin{array}{r} 45 \\ -\,28 \\ \hline 7 \end{array}$$

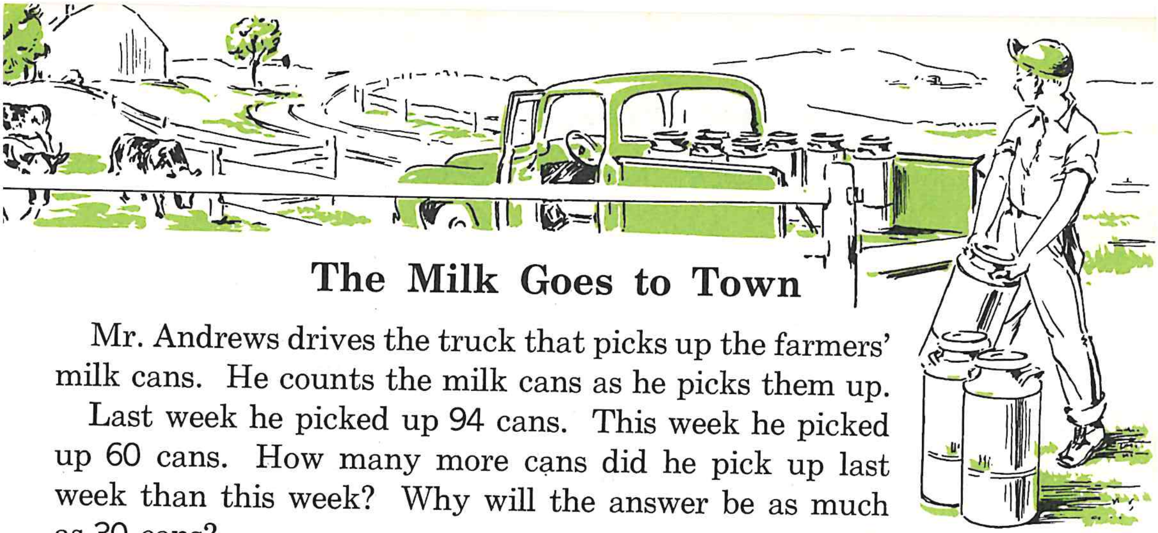
We cannot subtract 8 ones from 5 ones. When 1 ten is changed to 10 ones, we then have 15 ones. 8 ones from 15 ones = 7 ones. Write 7 in ones place in the answer.

$$\begin{array}{r} 45 \\ -\,28 \\ \hline 17 \end{array}$$

Subtract the tens. 2 tens from 3 tens = 1 ten. Write 1 in tens place in the answer. Mr. Bell had 17 chickens left.

Subtract, thinking tens and ones:

	a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
1.	$\begin{array}{r} 67 \\ -\,29 \\ \hline \end{array}$	$\begin{array}{r} 45 \\ -\,18 \\ \hline \end{array}$	$\begin{array}{r} 90 \\ -\,46 \\ \hline \end{array}$	$\begin{array}{r} 35 \\ -\,18 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ -\,8 \\ \hline \end{array}$	$\begin{array}{r} 38 \\ -\,19 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ -\,7 \\ \hline \end{array}$	$\begin{array}{r} 27 \\ -\,19 \\ \hline \end{array}$
2.	$\begin{array}{r} 82 \\ -\,17 \\ \hline \end{array}$	$\begin{array}{r} 60 \\ -\,47 \\ \hline \end{array}$	$\begin{array}{r} 37 \\ -\,18 \\ \hline \end{array}$	$\begin{array}{r} 56 \\ -\,19 \\ \hline \end{array}$	$\begin{array}{r} 41 \\ -\,17 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ -\,9 \\ \hline \end{array}$	$\begin{array}{r} 33 \\ -\,27 \\ \hline \end{array}$	$\begin{array}{r} 20 \\ -\,8 \\ \hline \end{array}$



The Milk Goes to Town

Mr. Andrews drives the truck that picks up the farmers' milk cans. He counts the milk cans as he picks them up.

Last week he picked up 94 cans. This week he picked up 60 cans. How many more cans did he pick up last week than this week? Why will the answer be as much as 30 cans?

$$\begin{array}{r} 94 \\ -\,60 \\ \hline 34 \end{array} = \begin{array}{r} \text{9 tens and 4 ones} \\ -\,\text{6 tens and 0 ones} \\ \hline \text{3 tens and 4 ones} \end{array}$$

4 ones − 0 ones = ?.

9 tens − 3 tens = ?.

The answer is ?.

Thursday Mr. Andrews picked up 30 cans. Friday he picked up 16 cans. How many more cans did he pick up Thursday than Friday?

We think this way:

$$\begin{array}{r} 30 \\ -\,16 \\ \hline \end{array} = \begin{array}{rr} \text{Tens} & \text{Ones} \\ 3 & 0 \\ -\,1 & 6 \\ \hline \end{array}$$

You must subtract the ones first. You cannot take 6 ones from no ones. You can use 1 of the 3 tens to get some ones. This gives 10 in ones place. Why?

$$\begin{array}{r} 30 \\ -\,16 \\ \hline 14 \end{array} = \begin{array}{rr} \text{Tens} & \text{Ones} \\ 2 & 10 \\ -\,1 & 6 \\ \hline 1 & 4 \end{array}$$

Now we can subtract the ones: 6 ones from 10 ones = 4 ones.

Subtract the tens: 1 ten from 2 tens = 1 ten. The answer is 14.

1. Subtract:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
30	40	50	80	70	40	80	90	40
18	29	34	17	36	13	45	32	21

Practice Work in Subtraction

As you do these, always think first, "About how much should I get?"

1. $$\begin{array}{r} 60 \\ -\ 5 \\ \hline \end{array} = \begin{array}{lr} & \text{6 tens and ? ones} \\ - & \text{5 ones} \\ \hline \end{array} = \begin{array}{lr} & \text{? tens and ? ones} \\ - & \text{5 ones} \\ \hline & \text{? tens and ? ones} \end{array} = \ ?$$

What do you do with the zero in 60 in the subtraction?

2. $$\begin{array}{r} 47 \\ -\ 8 \\ \hline \end{array} = \begin{array}{lr} & \text{? tens and ? ones} \\ - & \text{8 ones} \\ \hline \end{array} = \begin{array}{lr} & \text{? tens and ? ones} \\ - & \text{8 ones} \\ \hline & \text{? tens and ? ones} \end{array} = \ ?$$

3. $$\begin{array}{r} 82 \\ -\ 7 \\ \hline \end{array} = \begin{array}{lr} & \text{? tens and ? ones} \\ - & \text{7 ones} \\ \hline \end{array} = \begin{array}{lr} & \text{? tens and ? ones} \\ - & \text{7 ones} \\ \hline & \text{? tens and ? ones} \end{array} = \ ?$$

4. Subtract, writing tens and ones:

$$\begin{array}{r} 86 \\ -\ 28 \\ \hline \end{array} = \begin{array}{lr} & \text{8 tens and 6 ones} \\ - & \text{2 tens and 8 ones} \\ \hline & \text{? tens and ? ones} \end{array}$$

$$\begin{array}{r} 45 \\ 18 \\ \hline \end{array} \qquad \begin{array}{r} 48 \\ 19 \\ \hline \end{array} \qquad \begin{array}{r} 63 \\ 27 \\ \hline \end{array} \qquad \begin{array}{r} 75 \\ 47 \\ \hline \end{array}$$

Subtract, thinking tens and ones:

	a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
5.	57	60	34	45	41	83	30	56
	26	42	29	26	17	49	10	40
6.	96	84	80	72	76	78	40	64
	49	35	58	36	50	39	28	29
7.	17	24	46	56	82	84	90	60
	9	12	36	20	26	38	47	40

More Practice Work

1. Subtract (write tens and ones):

$$\begin{array}{r} 50 \\ -\ 38 \\ \hline \end{array} = \begin{array}{r} \text{5 tens and 0 ones} \\ -\ \text{3 tens and 8 ones} \\ \hline \end{array} = \begin{array}{r} \text{4 tens and ? ones} \\ -\ \text{3 tens and 8 ones} \\ \hline \end{array}$$

a.	b.	c.	d.	e.	f.	g.
80	70	40	90	30	60	50
− 34	− 16	− 35	− 39	− 12	− 38	− 11

2. Subtract (think tens and ones):

Think this: $$\begin{array}{r} 28 \\ -\ 15 \\ \hline \end{array} = \begin{array}{r} \text{2 tens and 8 ones} \\ -\ \text{1 ten and 5 ones} \\ \hline \end{array} = ?$$

48	79	88	45	74	46	87
− 30	− 27	− 40	− 13	− 53	− 35	− 20

3. Subtract (think the subtraction facts):

70	46	87	90	70	89	80
− 43	− 30	− 40	− 36	− 52	− 60	− 34

4. It takes Carol 20 minutes to wash the dishes. It is ten minutes after 6 now. At what time will she be finished?

5. Danny does not like to wipe dishes. He told Carol he would give her 4¢ to wipe all the forks, 2¢ to wipe all the knives, and 3¢ to wipe the spoons. How much will Carol earn if she wipes them for Danny?

6. Mother looked at the cups and glasses. There were 14 cups and glasses in all, but only 9 of them were wiped dry. How many did Danny have to do again?

7. Carol washed so many pots and pans that Danny was sure she was washing some of them twice. There were 6 small pans, 3 frying pans, and 5 round pots. How many pots and pans were there in all?

Fried Chicken Supper

1. Danny's mother invited his football pals for a chicken supper. There were 15 boys in all. If 7 of them sat at one table, how many sat at another table?

2. Danny's mother knew how hungry Danny and his friends always were after a football game — especially for fried chicken. She bought 7 chickens for the boys. Each chicken was cut into 9 pieces. How many pieces would there be in 7 chickens? How many pieces would be left if each boy ate 4 pieces?

3. Carol ate in the kitchen that night so it could be "Boys' Night" in the dining room. She asked Danny to make a wish with her on a wish bone while he was waiting for the boys to get there. Carol wished for puppets for the play she wants to give. She needs 17 puppets in all. She has 9 now. She wished for ? more.

4. Danny wished he could make a touchdown for every one of the 23 days left in November. He has already made 9. How many would he then have in all?

5. Danny's mother made 3 apple pies for the boys. She cut each pie into 6 pieces. If each boy ate one piece, how many pieces would be left?

6. Danny's mother made 36 hot rolls for the boys. She asked Danny if that would be enough so each boy could have 2 rolls. Help Danny find out if this is enough, or how many more they will need.

7. Tom got the first piece of chicken, because he ran the most yards in the game. He ran 48 yards. Danny was next with 29 yards. How many more yards did Tom run than Danny?

8. The boys gave 15 cheers for Danny's mother and the good fried chicken supper. They liked it so much that they gave 15 cheers all over again. That is how many cheers in all?

Practice with numbers:

1. 84 is how much more than 56?

2. 47 is how much less than 82?

3. Which is more, 38 or 83? How much more?

4. Find the difference between a half-dollar and 75¢.

5. From 93, take the sum of 28 and 26.

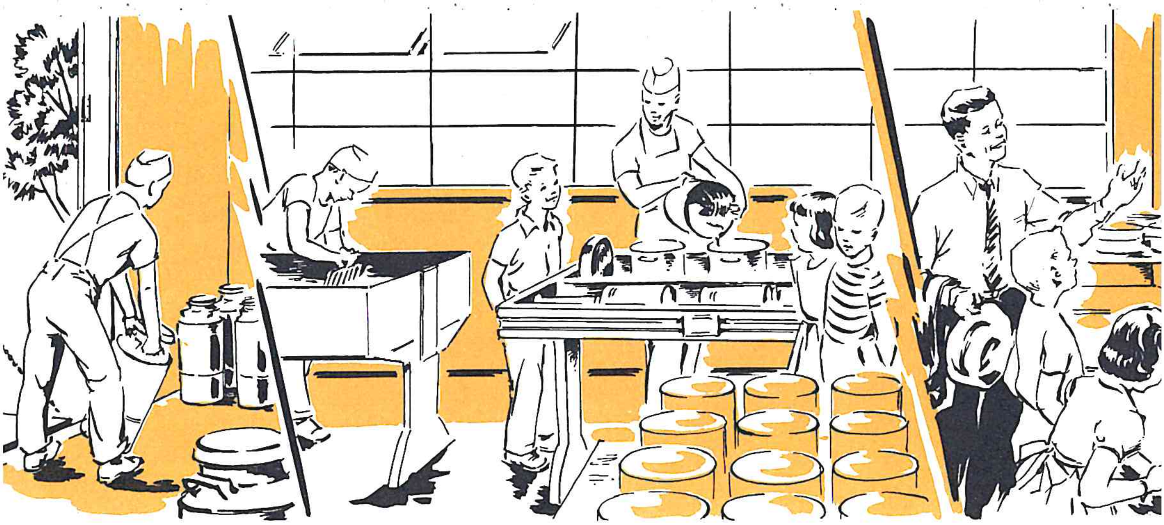
6. The Smith Dairy Farm has 40 milk cows. The Arden Farm has 14 milk cows. How many more cows does the Smith Dairy Farm have than the Arden Farm?

7. Add 27, 18, 11, and 8. Subtract the total from 90.

8. Marjorie lives 46 miles and Mary lives 52 miles from New York City. Who lives the farther distance away? How much farther?

Subtract:

	a.	b.	c.	d.	e.	f.	g.	h.
9.	75 19	36 27	67 18	45 17	33 18	17 8	58 29	39 19
10.	16 9	47 18	71 29	43 18	52 18	18 9	27 18	39 17
11.	13 2	17 14	16 9	10 4	30 26	49 24	56 33	92 36



Milk Is Made into Cheese and Butter

Bill's father took the children from the country school into the city to see where cheese is made.

1. In one room a man told Bill there were 90 milk cans. Bill knew there were 11 milk cans on his farm. He said, "There are ? more cans here than we have on our farm."

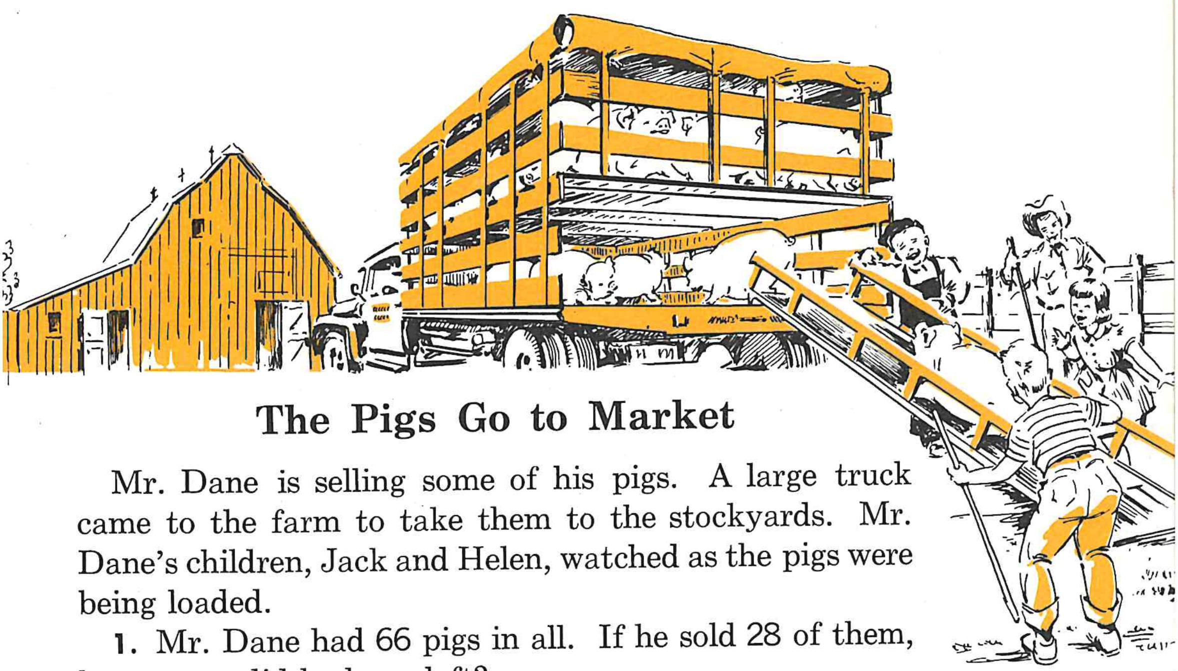
2. In the next room there were some large tubs. A man told the children there were 60 gallons of milk in the largest tub. He said there were 47 gallons of milk in a smaller tub. How many more gallons did the largest tub hold than the smaller one?

3. Bill saw 26 round cheeses on a table and 40 long cheeses hanging from a board. He said, "There are ? cheeses in all."

4. The children saw many boxes of butter at the factory. One box had 96 packages in it. Another box was only partly full with 47 packages in it. How many more packages of butter were in one box than in the other?

5. There were 18 men at work in one room and 8 men at work in another room. How many more were working in one room than in the other?

Problems for Review



The Pigs Go to Market

Mr. Dane is selling some of his pigs. A large truck came to the farm to take them to the stockyards. Mr. Dane's children, Jack and Helen, watched as the pigs were being loaded.

1. Mr. Dane had 66 pigs in all. If he sold 28 of them, how many did he have left?

2. Fourteen pigs were put in the top part of the truck. How many pigs were left to be put in the lower part of the truck?

3. Jack's father sold 2 big pigs that weighed 200 pounds each. If he was paid $25 for each 100 pounds, how much did he receive for each of these pigs? How much would he receive for both pigs?

4. Jack and his father figured that the corn and skim milk each of the two pigs ate was worth $19. How much did they make on each pig?

5. The pigs did not like to go up the loading chute into the truck. After half an hour 19 pigs were in the truck. How many pigs were still to be loaded?

6. It took 45 minutes to load all the pigs. How much less than an hour did it take?

7. One pig weighs 86 pounds. Another weighs 79 pounds. How much more does the first one weigh than the second one?

Skill Comes from Understanding

Which one of these methods is easier for you? In each example 37 has been used as 2 tens and 17 ones. Why?

Take-away Method	**How Many More Method**
Subtraction facts, thinking tens and ones	How many more, thinking tens and ones
$\begin{array}{r} 37 \\ -\ 19 \\ \hline \end{array} \quad \begin{array}{l} = 2 \text{ tens and } 17 \text{ ones} \\ -\ 1 \text{ ten and } 9 \text{ ones} \\ \hline \end{array}$	$\begin{array}{r} 37 \\ -\ 19 \\ \hline \end{array} \quad \begin{array}{l} = 2 \text{ tens and } 17 \text{ ones} \\ -\ 1 \text{ ten and } 9 \text{ ones} \\ \hline \end{array}$
a. Subtract the ones. 9 ones from 17 ones = ? ones. $\begin{array}{r} 17 \\ -9 \\ \hline \end{array} = \begin{array}{r} 10 \\ -9 \\ \hline 1 \end{array} \text{ and } 7 = 8$	**a.** Subtract the ones. 9 ones from 17 ones = ? ones. 9 and how many more are 17? 9 and 8 are 17. Then 9 from 17 = 8.
b. Now subtract the tens. 1 ten from the 2 tens that are left = 1 ten.	**b.** Subtract the tens. 1 ten from the 2 tens that are left = 1 ten.

What is the answer?

You may like one of these methods better than the other one. Both methods give the right answer.

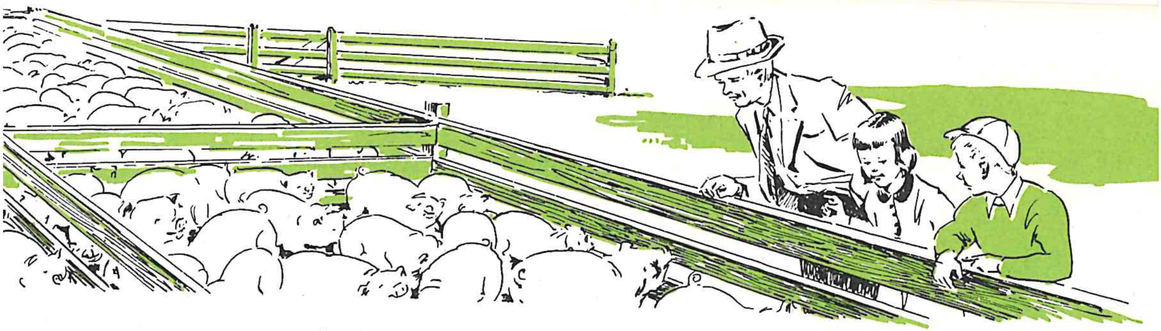
Which method is the shorter? If we do things the shorter way, there is less chance of making a mistake. Why?

1. Subtract, using both methods:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
42	96	35	68	45	36	54	38
18	27	17	39	19	17	27	19

2. Subtract, using the take-away method:

86	75	64	75	43	74	53	29
48	38	20	19	16	29	10	13



A Visit to the Stockyards

Jack and Helen visited the stockyards with their father. There were many pens with different animals in each pen. The animals were butchered there, and the meat was sold to meat markets all over the city.

1. Helen was surprised to see so many pens of pigs. She counted the pigs in one pen, and found that there were 42 pigs in it. In the next pen there were 39 pigs. How many more pigs were there in the first pen than in the second?

2. Jack and Helen went inside the stockyards where the butchering was done. They saw a man cutting hams. He had 16 hams already cut. He told Jack that he cuts about 50 hams a day. Jack knew he would cut about ? more before the day was over.

3. Jack saw 12 gallons of lard that had just been made from some of the fat. A man told him that they had made 41 gallons the day before. How many more gallons were made the day before than were just made?

4. The children were surprised to hear that every bit of the pig is used. Even the hoof (the horny part of the foot) is used. "We get about 5 buttons from each hoof," the man told them. Helen figured out how many buttons could be made from the 4 hoofs of a pig. (How many?) They get about 45 buttons from a cow's hoofs. How many less buttons can they get from a pig's hoof than a cow's hoof?

Checking Subtraction

$$\begin{array}{r} 85 \\ -\ 23 \\ \hline 62 \end{array}$$

The number from which another number is to be subtracted is the whole, or the total amount.

The number that is being subtracted is one part of the whole.

The difference, or the answer, is the other part of the whole. One way to check the answer to be sure it is right, is to subtract this answer, or difference, from the whole.

$$\begin{array}{r} 85 \\ -\ 23 \\ \hline 62 \end{array} \qquad \begin{array}{rl} \text{Check} & \\ 85 & \text{— Whole} \\ -\ 62 & \\ \hline 23 & \end{array}$$

$$\begin{array}{r} 81 \\ -\ 38 \\ \hline 43 \end{array} \qquad \begin{array}{rl} \text{Check} & \\ 81 & \text{— Whole} \\ -\ 43 & \\ \hline 38 & \end{array}$$

Subtract the answer from the whole. If your first answer is right you will get the number that was to be subtracted.

Notice that the 38 which is the answer of the check is the same number as the number you first subtracted from 81.

1. Subtract and check:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
49	52	72	90	47	73	40	81
38	28	27	38	18	41	17	56

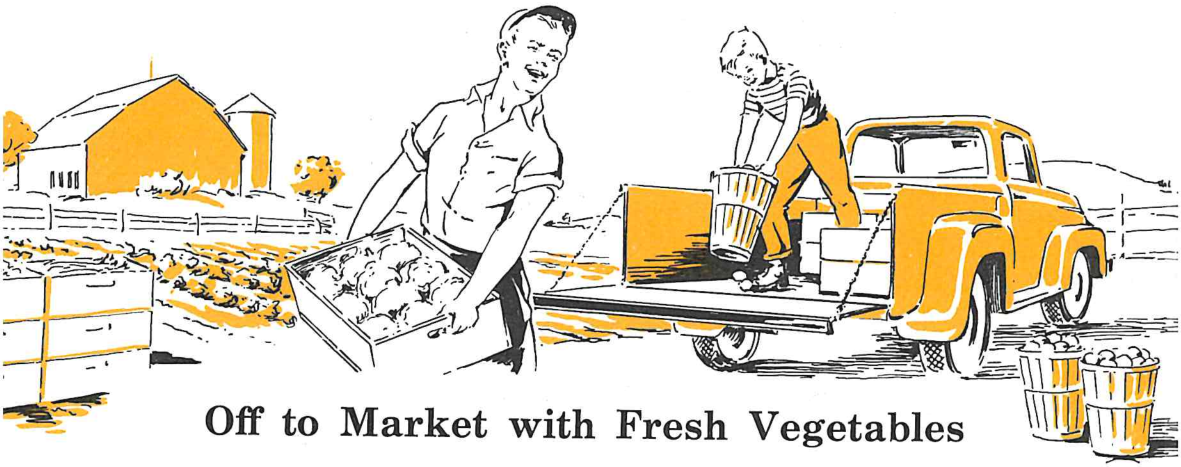
There is another way to check your answer to be sure it is right. Add your answer to the number being subtracted.

$$\begin{array}{r} 96 \\ -\ 41 \\ \hline 55 \end{array} \qquad \begin{array}{r} \text{Check} \\ 41 \\ +\ 55 \\ \hline 96 \end{array}$$

Add the answer and the number 41 to see if you get the number 96. The whole should equal the sum of its parts.

2. Subtract and check:

86	75	70	64	51	33	29	74
37	18	54	19	12	14	13	34



Off to Market with Fresh Vegetables

One morning Ben was out in the garden by 4 o'clock pulling beets and carrots, cutting cabbages and lettuce, and picking tomatoes. He wanted them to be very fresh when he sold them at the wholesale market.

As soon as the pigs, chickens, cows, and horses were fed and watered, and the cows milked, Ben and his father loaded the vegetables into a pick-up truck and started for the city. When they reached the market, they found many other farmers there with their vegetables.

1. Ben sold 2 dozen cabbages. How many things are in 2 dozen? How many less than 36 things are 2 dozen things?

2. Ben got 9¢ for each head of cabbage. Find how much less he received for the 24 cabbages than he would have received if he could have sold 36 of them.

3. Ben wanted 60¢ a basket for his tomatoes. A buyer offered him 52¢ a basket. How much less per basket is the buyer offering than the price which Ben is asking?

4. Ben sold 18 of the 30 bunches of green onions that he brought to market. How many bunches did he have left?

5. Ben sold only 8 bunches of carrots of the 30 that he brought. He took ? bunches back home.

Problems

Ben's Vegetables Are Sold in the Grocery Store

Mr. Miller bought some of Ben's vegetables at the wholesale market. He wanted to buy the freshest vegetables he could find to sell to the people who came into his store.

Mr. Miller bought a bushel of Ben's tomatoes. He sold them for 8¢ a pound. Nancy Stone bought some of them. How many whole pounds did she get with a half-dollar?

You want to know how many 8's there are in 50, don't you? Will you use your division facts to find the answer? You will remember that you can find how many 8's in 50 by subtracting, but you must keep tally on how many times you subtract.

Solve these problems by subtraction or by using division facts:

1. Mr. Miller sold the cabbage he bought from Ben for 9¢ a pound. How many pounds could Mrs. Brown buy for 45¢?

2. Ben's onions sold for 5¢ a bunch in the store. How many bunches could Dan buy for 25¢?

3. How many bunches of Ben's carrots could your mother buy for 48¢ at 16¢ a bunch?

4. The beets Mr. Miller bought from Ben sold very fast. They sold for 13¢ a bunch. How many bunches did Mrs. Cook buy for 65¢?

Problems

Subtracting Hundreds

$$\begin{array}{r} 145 \\ -\ 34 \\ \hline 1 \end{array}$$

Subtract the ones. 4 ones from 5 ones = 1 one.

$$\begin{array}{r} 145 \\ -\ 34 \\ \hline 11 \end{array}$$

Subtract the tens. 3 tens from 4 tens = 1 ten.

$$\begin{array}{r} 145 \\ -\ 34 \\ \hline 111 \end{array}$$

Subtract the hundreds. You have 1 hundred left in hundreds place with none to subtract.

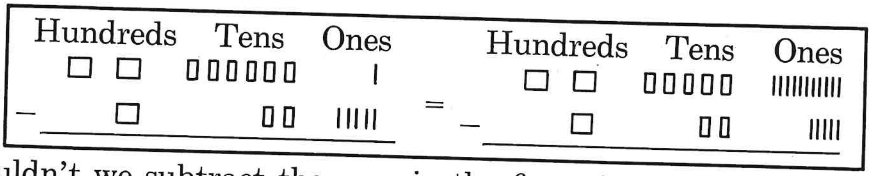
The answer is 111.

1. Subtract:

a.	b.	c.	d.	e.	f.	g.	h.
178	194	372	189	546	186	377	286
15	170	211	145	332	105	125	145

Subtract 125 from 261.

$$\begin{array}{r} 261 \\ -\ 125 \\ \hline \end{array} =$$



Why couldn't we subtract the ones in the first picture of counters? How did we get more ones?

$$\begin{array}{r} 261 \\ -\ 125 \\ \hline 6 \end{array}$$

Will the answer be more than 100? Why? Subtract the ones. 5 ones from 11 ones = 6 ones. Write 6 in ones place in the answer.

$$\begin{array}{r} 261 \\ -\ 125 \\ \hline 36 \end{array}$$

Can we subtract the tens? How many tens are left? 2 tens from 5 tens = 3 tens. Write 3 in tens place in the answer.

$$\begin{array}{r} 261 \\ -\ 125 \\ \hline 136 \end{array}$$

Subtract the hundreds. 1 hundred from 2 hundreds = 1 hundred. Write 1 in hundreds place in the answer. The answer is 136.

Harder Subtractions in Hundreds

$$\begin{array}{r} 4\overset{2}{\cancel{3}}\overset{10}{4} \\ -\,248 \\ \hline 6 \end{array}$$

Subtract the ones. You cannot take 8 ones from 4 ones. You take a ten and use it as 10 ones. Now you can subtract 8 ones from 14 ones. Write 6 in ones place in the answer.

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{\overset{10}{2}}{\cancel{3}}\overset{10}{4} \\ -\,248 \\ \hline 86 \end{array}$$

Subtract the tens. You cannot take 4 tens from 2 tens. You will use one of the hundreds. 1 hundred gives you 10 tens. 10 tens and the 2 tens that you already had = 12 tens. Then, 4 tens from 12 tens = 8 tens. Write 8 in tens place in the answer.

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{\overset{10}{2}}{\cancel{3}}\overset{10}{4} \\ -\,248 \\ \hline 186 \end{array}$$

Subtract the hundreds. You used one of the hundreds, so you have 3 hundreds left. 2 hundreds from 3 hundreds = 1 hundred. The answer is 186.

1. Subtract, changing 1 ten to 10 ones and 1 hundred to 10 tens when you find that you need more ones and tens:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
645	315	248	345	435	366	477	157
346	106	159	167	268	199	118	88

Tell why the steps in the following example are necessary as you do the thinking to subtract when there is a zero in ones place in the whole.

$$\begin{array}{r} 450 \\ -\,288 \\ \hline \end{array} = \begin{array}{r} 4\overset{4}{\cancel{5}}\overset{10}{0} \\ -\,288 \\ \hline 2 \end{array} = \begin{array}{r} \overset{3}{\cancel{4}}\overset{\overset{10}{4}}{\cancel{5}}\overset{10}{0} \\ -\,288 \\ \hline 62 \end{array} = \begin{array}{r} \overset{3}{\cancel{4}}\overset{\overset{10}{4}}{\cancel{5}}\overset{10}{0} \\ -\,288 \\ \hline 162 \end{array}$$

2. Subtract:

580	390	520	360	470	610	320	330
146	177	388	188	199	537	191	165

Subtracting—Zero in Tens Place

$$\begin{array}{r}602\\ \underline{138}\end{array}$$

Subtract the ones. You cannot take 8 ones from 2 ones. To get more ones you use a ten, but there are no tens in tens place.

$$\begin{array}{r}602\\ \underline{138}\\ 464\end{array}$$

You take a hundred and use it as 10 tens. Now we have some tens. Use 1 ten for more ones. There are 9 tens left, and you have 12 ones.

Subtract the ones: 8 ones from 12 ones = ? ones.
Subtract the tens: 3 tens from 9 tens = ? tens.
Subtract the hundreds: 1 hundred from 5 hundreds = ? hundreds.
The answer is 464.

There is another way you can think when you do the exercise shown above.

There are no tens in tens place, so you think that you have 6 hundreds changed to 60 tens. (Do you see 60 tens in 602?)

$$\begin{array}{r}\overset{5}{\cancel{6}}\overset{9}{\cancel{0}}\overset{10}{2}\\ \underline{-\ 138}\end{array}$$

Use 1 of the 60 tens to give you more ones.
Now you can begin subtracting.
Subtract the ones: 8 ones from 12 ones = ? ones.

$$\begin{array}{r}\overset{5}{\cancel{6}}\overset{9}{\cancel{0}}\overset{10}{2}\\ \underline{-\ 138}\end{array}$$

Now you must think, 59 tens = 5 hundreds and 9 tens.
Subtract the tens: 3 tens from 9 tens = ? tens.
Subtract the hundreds: 1 hundred from 5 hundreds = ? hundreds.

The answer is ? .

Subtract (do each exercise two ways):

$$\begin{array}{r}600\\ \underline{145}\end{array}\qquad \begin{array}{r}140\\ \underline{87}\end{array}\qquad \begin{array}{r}700\\ \underline{399}\end{array}\qquad \begin{array}{r}808\\ \underline{165}\end{array}\qquad \begin{array}{r}604\\ \underline{352}\end{array}\qquad \begin{array}{r}306\\ \underline{107}\end{array}\qquad \begin{array}{r}380\\ \underline{234}\end{array}\qquad \begin{array}{r}450\\ \underline{166}\end{array}$$

Do You Understand Subtraction?

$$\begin{array}{r} 265 \\ 187 \\ \hline \end{array}$$

Can you take 7 ones from 5 ones?

$$\begin{array}{r} 5 \text{ ones} \\ -\ 7 \text{ ones} \\ \hline \end{array}$$

Where will you get more ones?

$$\begin{array}{ccc} & 5 & 10 \\ 2 & \cancel{6} & 5 \\ 1 & 8 & 7 \\ \hline \end{array}$$

How many tens do you have left if you use 1 of them to give you more ones?

7 ones from ? ones = ? ones.

$$\begin{array}{ccc} & 5 & 10 \\ 2 & \cancel{6} & 5 \\ 1 & 8 & 7 \\ \hline \end{array}$$

Subtract the tens. Can you take 8 tens from 5 tens? Where will you get more tens? How many tens do you now have? 8 tens from ? tens = ? tens.

$$\begin{array}{r} 265 \\ 187 \\ \hline \end{array}$$

Subtract the hundreds. Why do you have only 1 left in hundreds place in the top number? If you take 1 hundred away, how many hundreds are left?

The answer is ? .

This time, we are going to change the hundreds and tens to tens when we see that we must use a ten to get more ones.

$$\begin{array}{r} 265 \\ 187 \\ \hline \end{array}$$

Can you take 7 ones from 5 ones?

Before we take a ten to get more ones, let us see how many tens there are in 2 hundreds and 6 tens.

$$\begin{array}{ccc} 2 & 5 & 10 \\ \cancel{2} & \cancel{6} & 5 \\ 1 & 8 & 7 \\ \hline \end{array}$$

Use one of the tens to give you more ones. How many tens are left?

$$\begin{array}{ccc} 2 & 5 & 10 \\ \cancel{2} & \cancel{6} & 5 \\ 1 & 8 & 7 \\ \hline \end{array}$$

Subtract the ones: 7 ones from 15 ones = ? ones.

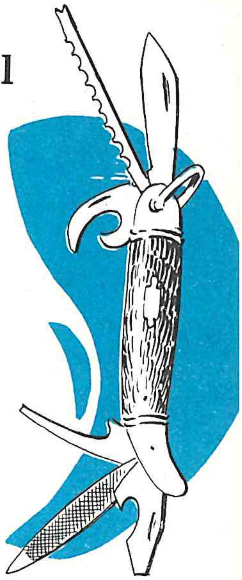
Subtract the tens: you must take tens from tens.

Finish the subtraction.

Subtract:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
340	187	500	167	508	413	523	805
117	96	144	118	309	117	226	178

Ben Earns His First Five-Dollar Bill



Ben sold five dollars' worth of vegetables yesterday. The buyer at the wholesale market gave him a crisp new five-dollar bill. It is the first one Ben ever had that was all his own.

Ben is going to spend part of the five dollars for something he wants. He had a hard time deciding. He changed his mind a hundred times, but he finally decided on a pocketknife that has four blades, another blade with which you can scale fish, and one part that is a fingernail file.

Ben wants to know how much money he will have left out of his five dollars if he spends $1.35 for the knife.

$$\begin{array}{r} \$\overset{4}{\cancel{5}}.\overset{9}{\cancel{0}}\overset{10}{0} \\ \underline{1.35} \end{array}$$

Subtract the ones (or pennies) first. You cannot take 5 ones from 0 ones. Before you take a dime (a ten) to give you more pennies (ones), change 1 of the 5 dollars to dimes (tens). Then you can use 1 dime (ten); 1 dime = 10 pennies; 10 − 5 = 5.

$$\begin{array}{r} \$\overset{4}{\cancel{5}}.\overset{9}{\cancel{0}}\overset{10}{0} \\ \underline{1.35} \\ 5 \end{array}$$

Subtract the tens. There are 9 dimes left; 3 dimes from 9 dimes = ? dimes. Write this in tens place in the answer.

$$\begin{array}{r} \$\overset{4}{\cancel{5}}.\overset{9}{\cancel{0}}\overset{10}{0} \\ \underline{1.35} \\ .65 \end{array}$$

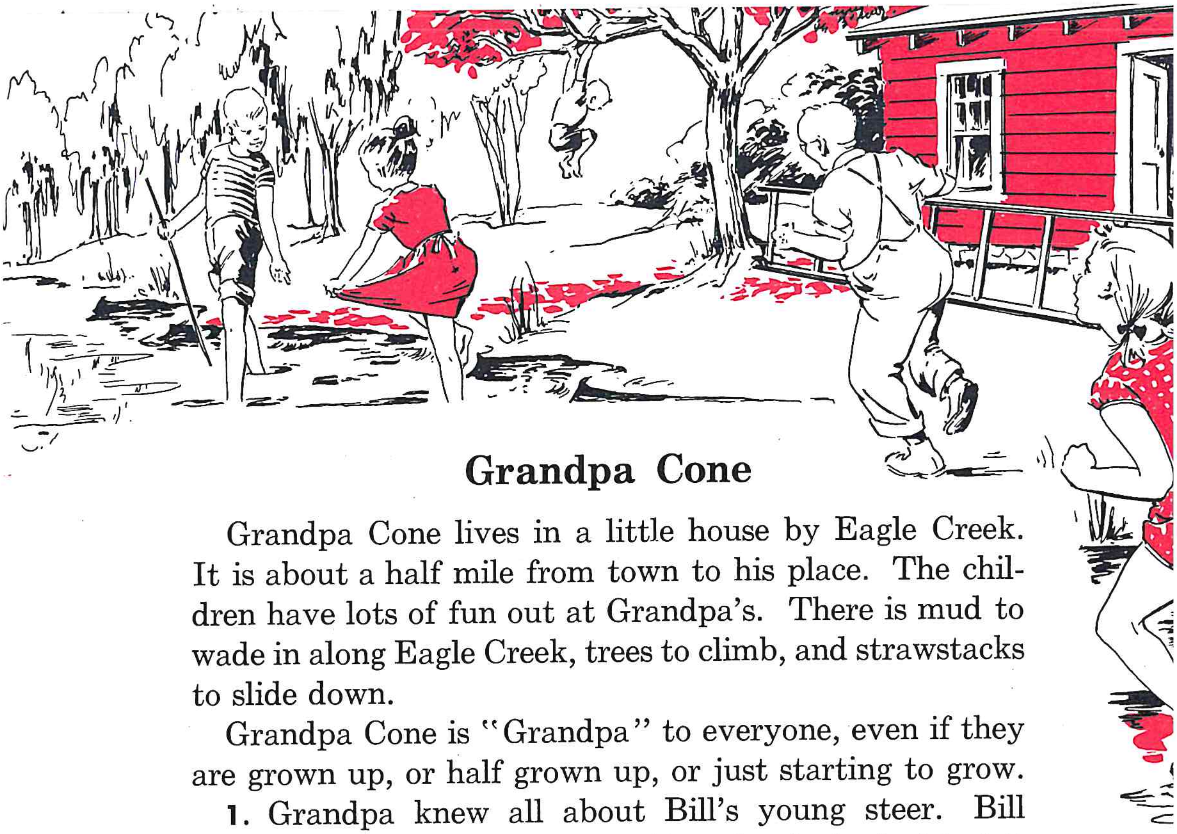
Subtract the dollars. You used 1 dollar to give you more dimes; 1 dollar from 4 dollars = ? dollars.

Ben will have ? left from his five dollars. Another way Ben could have subtracted:

$$\begin{array}{r} \$\overset{4}{\cancel{5}}.\overset{9}{\cancel{0}}\overset{10}{0} \\ \underline{1.35} \\ \$3.65 \end{array}$$

Ben could have changed $5.00 to 50 dimes. Then he could have used 1 dime to give him more pennies. He will have 49 dimes left.

Explain the work Ben did in subtracting.



Grandpa Cone

Grandpa Cone lives in a little house by Eagle Creek. It is about a half mile from town to his place. The children have lots of fun out at Grandpa's. There is mud to wade in along Eagle Creek, trees to climb, and strawstacks to slide down.

Grandpa Cone is "Grandpa" to everyone, even if they are grown up, or half grown up, or just starting to grow.

1. Grandpa knew all about Bill's young steer. Bill had brought it over to show to him after he had picked it out from his father's new calf crop. They both watched it grow up.

When the steer was grown up and ready for market, Bill and Grandpa were figuring how much Bill should make on his steer. Grandpa thought it should bring $64 at the market. This is the way they figured:

Step 1. Find the total expenses:

a. The amount Bill paid for the calf — $5
b. The total cost of feed — $35
c. The money spent to get the steer to market — $6
d. Total cost = ?

Step 2. The profit = selling price less all expenses.

How much did they figure that Bill should make?

A 2-Step Problem

Problems to Solve

1. Mr. Bell had 84 chickens to sell when he opened his store. If he sold 45 of them that day, how many did he have left to sell the next day?

2. Ben had 51 bunches of red beets to sell when he went into town today. If he sold only 38 of them, how many bunches did he have that he must take back home with him?

3. Mr. Jones has 44 pigs ready for market. His truck held only 28 pigs on the first trip he made. How many pigs will there be left for a second trip?

4. The children counted 72 cattle in one pen at the stockyards. If 37 of them were sold to one buyer, how many were left to be sold?

5. Mike cuts cornstalks for the calves. He cut 106 cornstalks last week. He cut 17 today. How many less did he cut today than last week?

6. Subtract:

a.	b.	c.	d.	e.	f.
306 219	512 307	789 234	625 488	900 126	386 79
$4.00 1.79	650 275	309 118	657 126	508 137	700 376
$5.00 3.60	386 124	145 91	750 126	582 147	$4.00 2.47

7. Use the addition way in these subtractions (think addition facts in each place):

469 227	480 256	509 345	360 240	239 60	627 205

Grandpa Is a Friend to All the Children

1. Patty Starr rode her bike out from town to talk over a very important problem with Grandpa. "Grandpa, I have saved a dollar and I don't know which of 2 things I should get for my mother's birthday."

a. Two yards of cloth to make an apron: it is pretty red cloth that costs 49¢ a yard.

b. A comb and pin dish for her dresser: they cost 87¢ together.

$$\boxed{\begin{array}{r} 49¢ \\ \underline{+\,49¢} \end{array}}$$

Grandpa asked, "Do you have enough money to buy whichever you want, Patty?"

Patty didn't know, so she and Grandpa figured it out. You should figure it with them and find which gift would be cheaper for Patty to buy.

2. Mike O'Day told Grandpa of a super plan to make money. The next day, Mike and Grandpa caught 10 tadpoles along Eagle Creek. Mike sold these at 7¢ each to a pet shop. How much money did they bring?

$$\boxed{\begin{array}{r} 7¢ \\ \underline{\times\,10} \end{array}}$$

They spent this money to buy wax and cord to make candles. They sold 9 candles at 10¢ each. Grandpa and Mike figured up how much they got for the candles. How much money did they make on the candles? How much have they made in all?

$$\boxed{\begin{array}{r} 10¢ \\ \underline{\times\,9} \end{array}}$$

3. Last spring the Davis twins' mother gave them some baby chicks to raise.

When they sold one chicken in the summer at the roadside stand, they wanted to know about how much money they had made.

The cost of the mixed grain for 1 chicken was about 15¢ + 20¢. The money the chicken brought was 90¢.

How much did the twins make on this chicken?

2-Step Problems

The 4-H Club Visits the City

Jack and Helen are going to visit the city with their 4-H Clubs. The 4-H leaders have made a time schedule so that everyone will be on time to visit the different places.

The trip has been planned very carefully so the children could see as many different things as possible.

TIME SCHEDULE

7:00 A.M.	Get up
7:05 A.M.	Start chores
8:00 A.M.	Breakfast
8:15 A.M.	Get ready
8:30 A.M.	Leave for city
9:15 A.M.	Arrive in city
9:30 A.M.	Visit stockyards
10:45 A.M.	Leave stockyards
10:55 A.M.	Visit bakery
11:50 A.M.	Leave bakery
11:57 A.M.	Drive to park
12:00 Noon	Eat lunch in park
1:00 P.M.	Visit newspaper office
2:30 P.M.	Leave newspaper office
2:40 P.M.	Arrive at zoo
4:15 P.M.	Leave for home

1. The alarm clock wakened Jack at 7:00 A.M. He jumped out of bed, dressed, and ran to do his chores. How long does he have to do his chores?

2. Jack and Helen know they will be so excited they will hardly be able to eat breakfast. How long will they have to eat breakfast?

3. They both will have their clothes laid out. How long will they have to dress?

4. How long does it take to drive to the park for lunch? How long will they spend in the park eating their lunch?

5. What time will Jack and Helen get home if it takes them as long to get home as it takes them to go to the city?

6. How many minutes is it from 11:45 A.M. to 12:35 P.M.?

7. Subtract 40 minutes from 6 hr. 15 min.

8. Which is longer, 1 hr. 12 min. or 75 min.? How much longer?

Figuring Time

Spending Money on the Trip to the City

1. Jack saved 15¢ each week for three weeks. Add to find how much he has saved. Multiply and see if you get the same answer.

2. Their father gave Jack and Helen 75¢ each to spend on their trip. How much money does Jack have in all?

3. Helen has 15¢ less than Jack. Find how much money Helen has.

4. Helen was hungry by the time they got to the zoo. She bought a hot dog for 20¢. How much money does she have left?

5. Jack bought 2 packages of peanuts to feed the monkeys. The peanuts cost 10¢ a bag. How much money does Jack have left?

6. Jack got a bag of popcorn for 15¢ and a cup of hot chocolate for 15¢.

a. How much money did Jack spend for the popcorn and hot chocolate?

b. Count the change Jack should receive from a half-dollar. Name the coins he could receive.

c. How much money does Jack have left?

7. Helen took 2 rides on the merry-go-round. Each ride cost 12¢.

a. How much did Helen spend for the 2 rides?

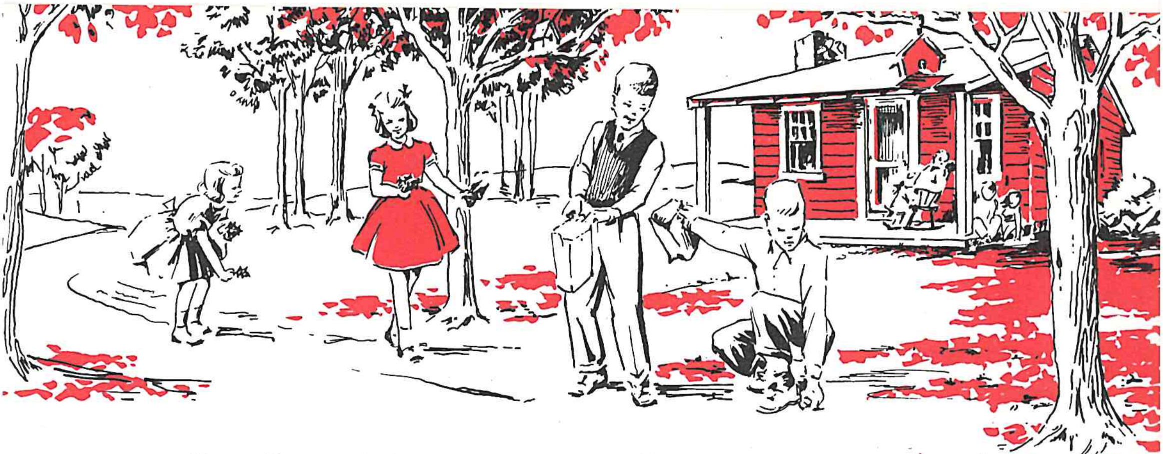
b. How much money does Helen have left?

8. Jack and Helen didn't spend any more money. Who came home with the most money, and how much more?

9. Subtract:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
57	188	91	50	153	67	84	96	24
38	176	54	17	119	38	35	58	9

Practice in Subtraction



Sunday Afternoon at Grandpa Cone's

1. Billy and Jimmy are picking up the walnuts down by the road. Billy has 195 walnuts. Jimmy has 67. How many more walnuts does Billy have than Jimmy?

2. Grandpa and the Davis twins have been working on birdhouses. Today they put them up and put some grain on the porch of each birdhouse. At four o'clock they counted 15 birds near the houses. An hour later they counted 23. How many came after four o'clock?

3. Patty got 29 red leaves from the maple down by Eagle Creek. Jean got 41 red leaves from the maple by the porch. How many more red leaves does Jean have than Patty?

4. Henry and Max are catching black ants in a bottle. Max has 86 ants in his bottle. Henry has 19. Find how many more ants Max has than Henry.

5. Some of the children are looking for pheasant feathers. Joe found 8, Fanny found 5, and Sharon found 10. Who has the most feathers? How many more does Sharon have than Joe? than Fanny?

6. Subtract:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
500	186	74	90	123	503	150	81
358	61	40	51	110	386	104	42

Problems and Exercises

Unit Review

1. Draw 17 circles. Cross out 8. How many do you have left?

2. Put 12 counters on your desk. Take away 5. How many are left?

3. Count the children in your schoolroom. If you take away 2 of them, how many are left?

4. Count the windows in your schoolroom. If you could take away 3 of them, how many would be left?

5.

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
12 − 8	18 − 9	9 − 5	14 − 5	10 − 8	17 − 8	11 − 4	13 − 8
14 − 9	12 − 3	13 − 9	9 − 9	15 − 7	10 − 4	11 − 7	9 − 2
10 − 7	13 − 4	9 − 3	17 − 9	11 − 5	14 − 6	9 − 6	15 − 8

6. Ben's beets were the size of baseballs. He had good luck selling them. He had only 3 bunches left out of 31. How many bunches did he sell?

7. Ben was glad he had not pulled his lettuce until that morning. It was so fresh he sold 31 of the 3 dozen heads he brought to market. Find how many he had left.

8. Which is more, 54 eggs or 41 eggs? How many more?

9. Is 70 more than 28? How many more or less?

10. Subtract. Check your work:

72 16	382 135	66 48	55 18	492 114	72 38	68 10	90 43

11. How many minutes is it from 7:38 A.M. to 8:15 A.M.?

12. What will be the time if you add 40 min. to 8:36 A.M.?

Unit Test

1. Subtract by writing tens and ones:

a.	b.	c.	d.	e.	f.	g.	h.
61	70	45	33	50	65	77	40
19	55	31	20	26	28	39	15

2. Subtract by thinking the facts:

96	50	84	448	82	93	274	118
39	27	31	180	47	58	126	87

3. Subtract by thinking "how many more" for the facts in tens and ones:

62	24	66	41	90	83	52	34
39	9	49	37	26	48	27	15

4. Jane had 95¢ in the school savings bank. One week she drew out 48¢ to buy a birthday gift for her brother. How much does she now have in the bank?

5. Ben went to the hardware store for his father. He bought a screw driver for 50¢ and nails for 36¢. How much change should he receive if he gave the clerk 90¢?

6. Some of the boys found a beaver's dam on Eagle Creek. They can crawl quietly on their stomachs to the dam where they can see the beavers work. One day they saw 2 beavers, another day they saw 6, and the next day they saw 3. If they are all different beavers, and each beaver cuts down a tree in 3 weeks' time, how many trees will this many beavers cut down in 6 weeks?

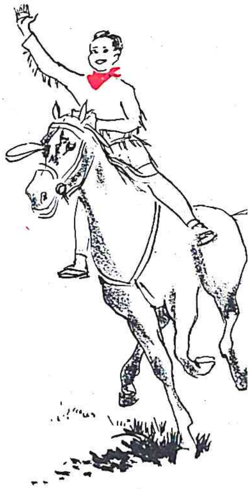
How many would be left from a grove of 81 trees after 6 weeks?

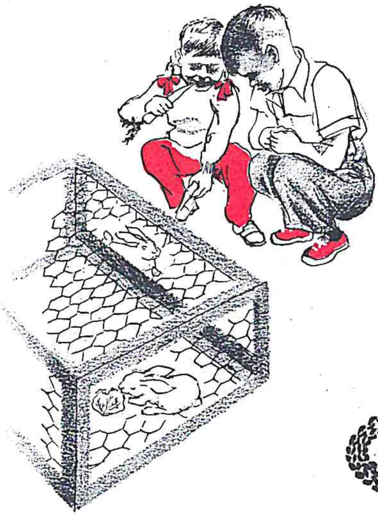
7. Subtract:

534	366	323	428	243	540	407	600
102	244	115	165	135	128	125	132

UNIT 6

Our Pets





Bill would rather have had a horse than anything he could think of. He got his horse, as you will see, but he still had problems. You see, he lived in town and had to pay someone to keep his horse until he moved out to the country.

Cookie is a dog — a wirehaired terrier. He carries Pete's shoes away and buries them. Cookie has a BIG, BIG appetite. He almost eats Pete out of house and home.

Hazel got her rabbit from a magician. She really did, and we know it sounds like magic. She likes carrots as much as the rabbit does.

Hazel heard a good joke the other day. A boy asked his friend how he knew carrots were good for his eyes. His friend said he knew they were, because no one ever saw a rabbit wearing glasses.

One of the boys in this unit has a chimpanzee. He is full of tricks. His favorite game is "Monkey see, monkey do." He does just what the children do.

Did you ever have a white rat that snuggled close to you to show you how much he liked you? Ken has two white rats. He calls them Terry and Perry.

Here are some of the problems the children said they had to think about in taking care of their pets.

1. When you buy food for your pet, what do you have to know about numbers? Will you ever need multiplication? When?

2. How would you find what 8 goldfish cost at 8¢ apiece?

3. Suppose you buy dog food that costs you 19¢ a can. Would you use addition to find what 3 cans would cost? If you knew how, could you use multiplication? Why?

4. Children can earn money so that they can take care of their pets. Tell some of the things they would need to know so they could figure out how much they had earned.

Let's See How Much You Remember

$$\boxed{\begin{array}{r}8\\ \times 2\\ \hline\end{array}\quad\begin{array}{r}8\\ +8\\ \hline\end{array}}$$

Multiplying means that we take a number so many times: 2 × 8, or two 8's. Both of these mean to take 8 two times.

Do the facts in the box tell you how addition and multiplication are related? Explain.

	a.	b.	c.	d.	e.	f.	g.	h.
1.	$\begin{array}{r}9\\ +9\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}7\\ +7\\ \hline\end{array}$	$\begin{array}{r}7\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}5\\ +5\\ \hline\end{array}$	$\begin{array}{r}5\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}6\\ +6\\ \hline\end{array}$	$\begin{array}{r}6\\ \times 2\\ \hline\end{array}$
	$\begin{array}{r}4\\ +4\\ \hline\end{array}$	$\begin{array}{r}4\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}3\\ +3\\ \hline\end{array}$	$\begin{array}{r}3\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}8\\ +8\\ \hline\end{array}$	$\begin{array}{r}8\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}2\\ +2\\ \hline\end{array}$	$\begin{array}{r}2\\ \times 2\\ \hline\end{array}$

$$\boxed{\begin{array}{r}\left.\begin{array}{r}6\\ 6\end{array}\right\rangle 12\\ +6\rightarrow 6\\ \hline\end{array}\quad\begin{array}{r}12\\ +6\\ \hline ?\end{array}\quad\begin{array}{r}6\\ \times 3\\ \hline ?\end{array}}$$

2. If two 6's are 12, then one more six gives 12 + 6, or three 6's. Why?

3. Fill the blanks to show that you may get multiplications from additions:

$$\begin{array}{r}\left.\begin{array}{r}7\\ 7\end{array}\right\rangle ?\\ +7\rightarrow ?\\ \hline\end{array}\quad\begin{array}{r}14\\ +7\\ \hline ?\end{array}\quad\begin{array}{r}7\\ \times 3\\ \hline ?\end{array}\qquad\qquad\begin{array}{r}\left.\begin{array}{r}9\\ 9\end{array}\right\rangle\rightarrow\ 18\\ +9\quad\rightarrow +9\\ \hline ?\end{array}\quad\begin{array}{r}9\\ \times 3\\ \hline ?\end{array}\qquad\qquad\begin{array}{r}\left.\begin{array}{r}4\\ 4\end{array}\right\rangle\rightarrow\ 8\\ +4\quad\rightarrow +4\\ \hline ?\end{array}\quad\begin{array}{r}4\\ \times 3\\ \hline ?\end{array}$$

$$\begin{array}{r}\left.\begin{array}{r}8\\ 8\end{array}\right\rangle\rightarrow\ 16\\ +8\quad\rightarrow +8\\ \hline ?\end{array}\quad\begin{array}{r}8\\ \times 3\\ \hline ?\end{array}\qquad\qquad\begin{array}{r}\left.\begin{array}{r}5\\ 5\end{array}\right\rangle\rightarrow\ 10\\ +5\quad\rightarrow +5\\ \hline ?\end{array}\quad\begin{array}{r}5\\ \times 3\\ \hline ?\end{array}$$

Fill the blanks, add, and do the multiplication:

a.

$$\begin{array}{r}\left.\begin{array}{r}6\\ 6\end{array}\right\rangle ?\\ \left.\begin{array}{r}6\\ +6\end{array}\right\rangle ?\\ \hline\end{array}\quad\begin{array}{r}12\\ +12\\ \hline ?\end{array}\quad\begin{array}{r}6\\ \times 4\\ \hline ?\end{array}$$

b.

$$\begin{array}{r}\left.\begin{array}{r}9\\ 9\end{array}\right\rangle ?\\ \left.\begin{array}{r}9\\ +9\end{array}\right\rangle ?\\ \hline\end{array}\quad\begin{array}{r}18\\ +18\\ \hline ?\end{array}\quad\begin{array}{r}9\\ \times 4\\ \hline ?\end{array}$$

Review Multiplication Facts

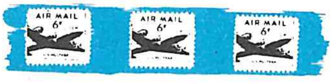
Other Multiplication Facts

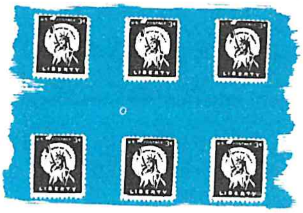
Here are some multiplication facts that you discovered earlier in your arithmetic work. Try those given below by covering the answers and writing them on a sheet of paper. Check and see if you remembered all of them.

The ones	*The twos*	*The threes*	*The fours*
1 × 1 = 1	1 × 2 = 2	1 × 3 = 3	1 × 4 = 4
2 × 1 = 2	2 × 2 = 4	2 × 3 = 6	2 × 4 = 8
3 × 1 = 3	3 × 2 = 6	3 × 3 = 9	3 × 4 = 12
4 × 1 = 4	4 × 2 = 8	4 × 3 = 12	4 × 4 = 16
5 × 1 = 5	5 × 2 = 10	5 × 3 = 15	5 × 4 = 20
6 × 1 = 6	6 × 2 = 12	6 × 3 = 18	6 × 4 = 24
7 × 1 = 7	7 × 2 = 14	7 × 3 = 21	7 × 4 = 28
8 × 1 = 8	8 × 2 = 16	8 × 3 = 24	8 × 4 = 32
9 × 1 = 9	9 × 2 = 18	9 × 3 = 27	9 × 4 = 36

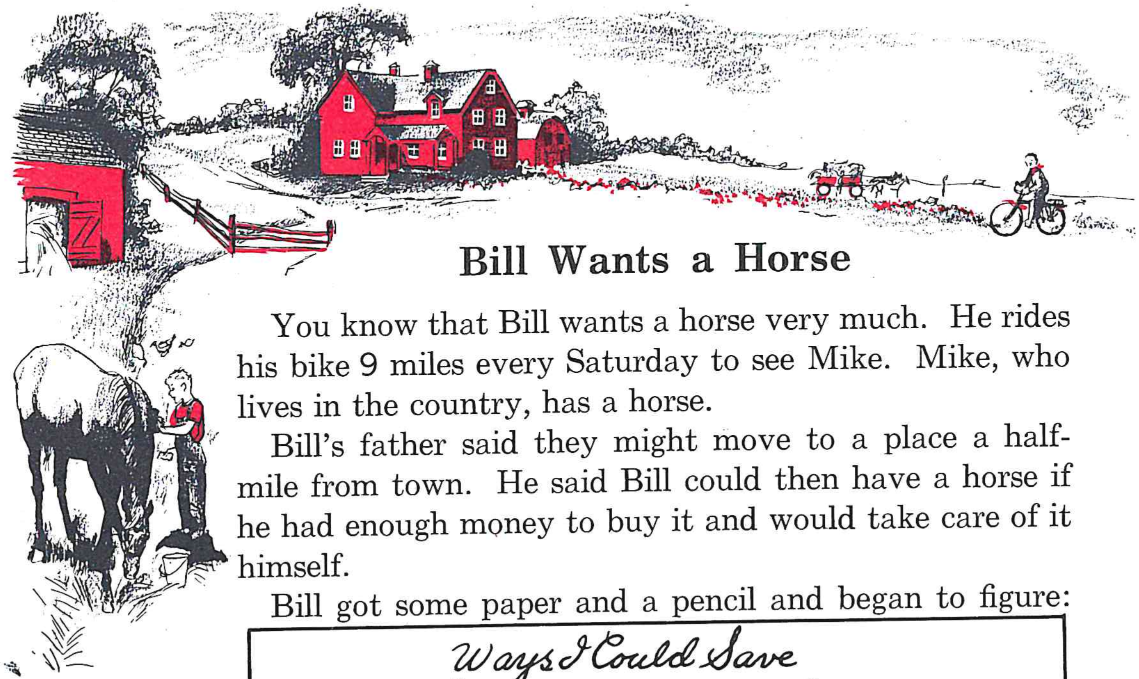
Practice any of them that you had forgotten.

1. How much will 9 three-cent stamps cost you?
2. What will you have to pay for 8 two-cent post cards?
3. How do you explain that these stamps cost the same?





4. How much would four 6¢ airmail stamps cost?
5. How much would eight candy bars cost on sale at 4¢ each?
6. Count by 4's to 36.



Bill Wants a Horse

You know that Bill wants a horse very much. He rides his bike 9 miles every Saturday to see Mike. Mike, who lives in the country, has a horse.

Bill's father said they might move to a place a half-mile from town. He said Bill could then have a horse if he had enough money to buy it and would take care of it himself.

Bill got some paper and a pencil and began to figure:

Ways I Could Save
35¢ a week for running errands
19¢ for each moss agate found (I have 6 already)

Bill started to multiply 6 × 19¢. He couldn't do it. He said, "It is the 9's that bother me the most."

$$\begin{array}{r} 19\text{¢} \\ \times\ 6 \\ \hline ? \end{array}$$

Bill figured this way:
He knew that 18 = 9 + 9, or 2 × 9 = 18. But he needs six 9's.

$$\begin{array}{r} 9 \\ +\ 9 \\ \hline 18 \end{array} \quad \text{or} \quad \begin{array}{r} 9 \\ \times\ 2 \\ \hline 18 \end{array}$$

Four 9's are twice what two 9's are: 4 × 9 = ?

$$\left.\begin{array}{r} 9 \\ 9 \end{array}\right\rangle 18 \qquad \begin{array}{r} 18 \\ +\ 18 \\ \hline 36 \end{array} \qquad \begin{array}{r} 9 \\ \times\ 4 \\ \hline ? \end{array}$$

$$\left.\begin{array}{r} 9 \\ +\ 9 \end{array}\right\rangle 18$$

How would you find six 9's?
If four 9's are 36, then eight 9's are twice this amount.
8 × 9 = ?

$$\begin{array}{r} 9 \\ \times\ 6 \\ \hline ? \end{array} \qquad \begin{array}{r} 36 \\ +\ 36 \\ \hline 72 \end{array} \qquad \begin{array}{r} 9 \\ \times\ 8 \\ \hline ? \end{array}$$

Times Facts — Some of the Nines

More about the Nines

Bill said, "Three 9's are two 9's and one more 9." $3 \times 9 = \ ?$

Two 9's = 18
$18 + 9 = 27$

$$\begin{array}{r} 9 \\ \times 3 \\ \hline ? \end{array}$$

If three 9's are 27, then six 9's are twice this amount. $6 \times 9 = \ ?$

Three 9's = 27
$27 + 27 = 54$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline ? \end{array}$$

Nine 9's will be three times the amount that three 9's are.
$9 \times 9 = \ ?$

Three 9's = 27
$27 + 27 + 27 = 81$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline ? \end{array}$$

Five 9's are three 9's and two 9's.
$5 \times 9 = \ ?$

Three 9's = 27
Two 9's = 18
$27 + 18 = 45$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline ? \end{array}$$

Seven 9's are three 9's and four 9's.
$7 \times 9 = \ ?$

Three 9's = 27
Four 9's = 36
$27 + 36 = 63$

$$\begin{array}{r} 9 \\ \times 7 \\ \hline ? \end{array}$$

Bill thought, "Now if I get in a trap I can always get out of it. I know how to figure the 9's. I'll see if I know all of them."

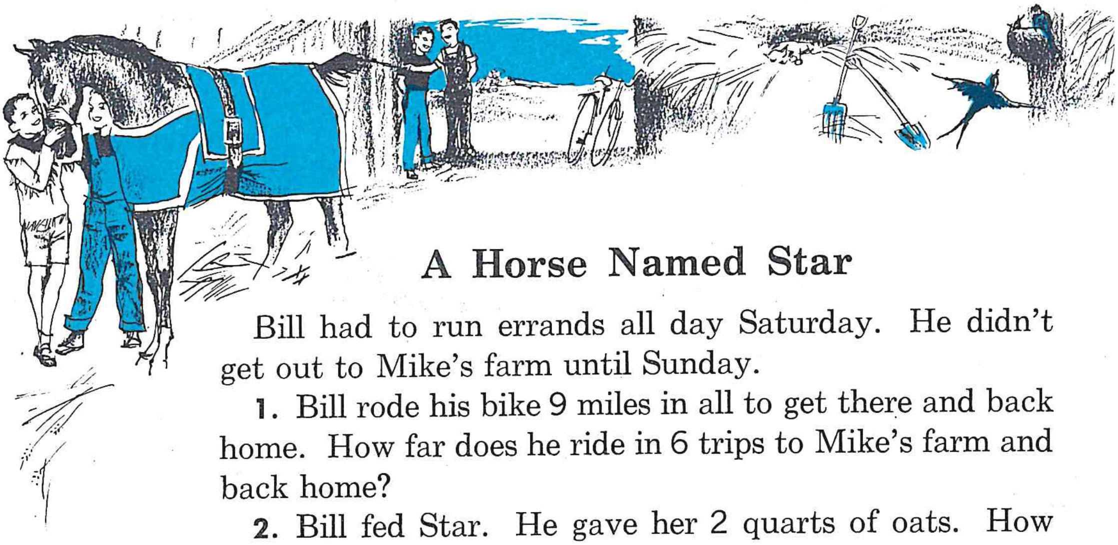
1. Do these with Bill:

$$\begin{array}{rrrrrrrrr} 9 & 9 & 9 & 9 & 9 & 9 & 9 & 9 & 9 \\ \underline{\times 1} & \underline{\times 2} & \underline{\times 4} & \underline{\times 3} & \underline{\times 5} & \underline{\times 7} & \underline{\times 9} & \underline{\times 6} & \underline{\times 8} \end{array}$$

2. What would 9×0 have as an answer? Why?

3. Answer these questions:

$$\begin{array}{rrrrrrrrr} \textbf{a.} & \textbf{b.} & \textbf{c.} & \textbf{d.} & \textbf{e.} & \textbf{f.} & \textbf{g.} & \textbf{h.} & \textbf{i.} \\ ? & ? & ? & 6 & ? & 8 & ? & 9 & 0 \\ \underline{\times 9} & \underline{\times 9} & \underline{\times 9} & \underline{\times 9} & \underline{\times 9} & \underline{\times 9} & \underline{\times 9} & \underline{\times ?} & \underline{\times 9} \\ 45 & 81 & 63 & ? & 18 & ? & 36 & 54 & ? \end{array}$$



A Horse Named Star

Bill had to run errands all day Saturday. He didn't get out to Mike's farm until Sunday.

1. Bill rode his bike 9 miles in all to get there and back home. How far does he ride in 6 trips to Mike's farm and back home?

2. Bill fed Star. He gave her 2 quarts of oats. How many quarts does Star eat in a week if she eats 2 quarts every morning and night?

3. Mike told Bill that a neighbor would sell one of his horses to him, but Bill does not have enough money to pay cash for a horse. The man said Bill could pay for the horse by paying $8 a month for 9 months. Find how much the horse would cost.

4. Mike's father said he would keep the horse for Bill until spring for $2 a month. There are 9 months left before spring comes. How much will Bill pay Mike's father for keeping the horse?

5. How much will Bill have to pay each month for the cost of the horse and to Mike's father for keeping the horse? What would the total be for 9 months?

6. How much will Bill have paid on the cost of the horse in 5 months? in 7 months?

The Nines Facts

$1 \times 9 = 9$	$4 \times 9 = 36$	$7 \times 9 = 63$
$2 \times 9 = 18$	$5 \times 9 = 45$	$8 \times 9 = 72$
$3 \times 9 = 27$	$6 \times 9 = 54$	$9 \times 9 = 81$

Using the Nines

The Eights

Hazel thought the 8's were the easiest of all the multiplication facts. This is why she thinks they are easy:

She knows that two 8's are 16, so four 8's are twice as much as two 8's:

Four 8's are 32:
$4 \times 8 = \ ?$

$$\begin{array}{r} \left.\begin{array}{r}8\\8\end{array}\right\rangle 16 \\ \left.\begin{array}{r}8\\+8\end{array}\right\rangle 16 \\ \hline \end{array} \qquad \begin{array}{r} 16 \\ +16 \\ \hline ? \end{array}$$

Eight 8's are twice as much as four 8's:
Eight 8's = 64
$8 \times 8 = \ ?$

$$\begin{array}{r} 32 \\ +32 \\ \hline ? \end{array}$$

Three 8's are two 8's and one 8:
Three 8's are ?
$3 \times 8 = \ ?$

$$\begin{array}{r} 8 \\ 8 \\ +8 \\ \hline \end{array} \qquad \begin{array}{r} 16 \\ +8 \\ \hline ? \end{array}$$

Six 8's are twice as much as three 8's:
Six 8's are ?
$6 \times 8 = \ ?$

$$\begin{array}{r} 24 \\ +24 \\ \hline ? \end{array}$$

Nine 8's are three times as much as three 8's:
$3 \times 24 = \ ?$ Nine 8's are ?
$9 \times 8 = \ ?$

Another way Hazel can remember nine 8's is to think that ten 8's are 80, so nine 8's are $80 - 8 = \ ?$.

Five 8's are three 8's and two 8's:

$5 \times 8 = \ ?$

$$\begin{array}{r} 24 \\ +16 \\ \hline ? \end{array}$$

Seven 8's are two 8's and two 8's and three 8's:

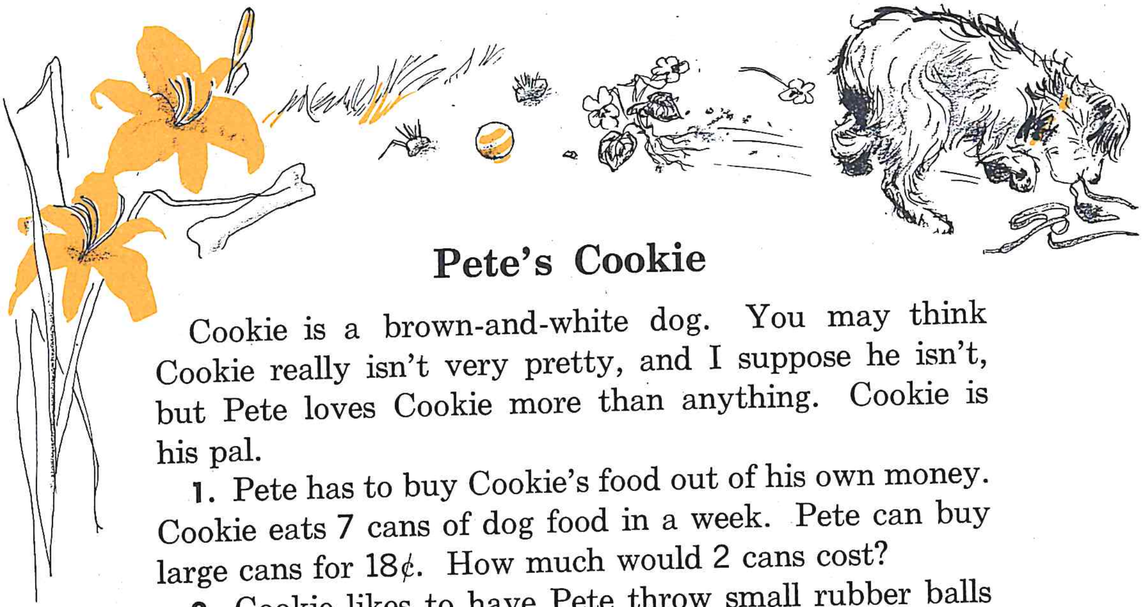
$$\begin{array}{r} 16 \\ 16 \\ +24 \\ \hline ? \end{array} \qquad \begin{array}{r} 8 \\ \times 7 \\ \hline ? \end{array}$$

Answer the questions:

Two 8's = ?
Three 8's = ?
Five 8's = ?
$6 \times \ ? = 48$
$3 \times 8 = \ ?$
$5 \times \ ? = 40$

Four 8's = ?
Six 8's = ?
Seven 8's = ?
$? \times 8 = 72$
$4 \times \ ? = 32$
$2 \times \ ? = 16$

Eight 8's = ?
Nine 8's = ?
Two 8's = ?
$7 \times 8 = \ ?$
$8 \times 8 = \ ?$
$9 \times \ ? = 72$



Pete's Cookie

Cookie is a brown-and-white dog. You may think Cookie really isn't very pretty, and I suppose he isn't, but Pete loves Cookie more than anything. Cookie is his pal.

1. Pete has to buy Cookie's food out of his own money. Cookie eats 7 cans of dog food in a week. Pete can buy large cans for 18¢. How much would 2 cans cost?

2. Cookie likes to have Pete throw small rubber balls so he can run after them and bring them back. Pete threw 8 balls 8 times. How many balls did Cookie bring back to Pete altogether?

3. Cookie follows Pete when he goes on errands. They walked 8 blocks each day for the past 9 days. How many blocks did they walk in all?

4. Cookie used to bury Pete's shoes until Pete learned to put them away. Now he buries anything he can find. This week he has buried 3 pairs of Pete's shoelaces for which Pete paid 8¢ each. How much will 3 new pairs of shoelaces cost Pete?

5. Pete buys an 8¢ bone at the butcher shop once a week for Cookie. What does he spend for bones in 7 weeks?

The Eights Facts

1 × 8 = 8
2 × 8 = 16
3 × 8 = 24
4 × 8 = 32
5 × 8 = 40
6 × 8 = 48
7 × 8 = 56
8 × 8 = 64
9 × 8 = 72

Multiplication and Addition Are Related

1. If you forget a fact like $6 \times 9 = \ ?$, you can always make an addition exercise out of it. You can add by building tens.

$$\begin{array}{rl} 9 & \\ 9 & \\ 9 & \rightarrow 2 \text{ and } 7 \\ 9 & \rightarrow 3 \text{ and } 6 \\ 9 & \\ +9 & \\ \hline 54 & \end{array}$$

Add from the top down: $9 + 9 = 18$. The ending is 8. Separate the next 9 into 2 and 7. $18 + 2 = 20$, $20 + 7 = 27$.

What is the ending in 27? Separate the fourth 9 into 3 and 6. Why? $27 + 3 = 30$, then $30 + 6 = 36$.

Finish the addition by using endings. $36 + 9 = \ ?$ It will be a 40's number ending in 5. Why? $36 + 9 = 45$. $45 + 9 = \ ?$

2. Fill in the blanks to show how we can get six 9's this way:

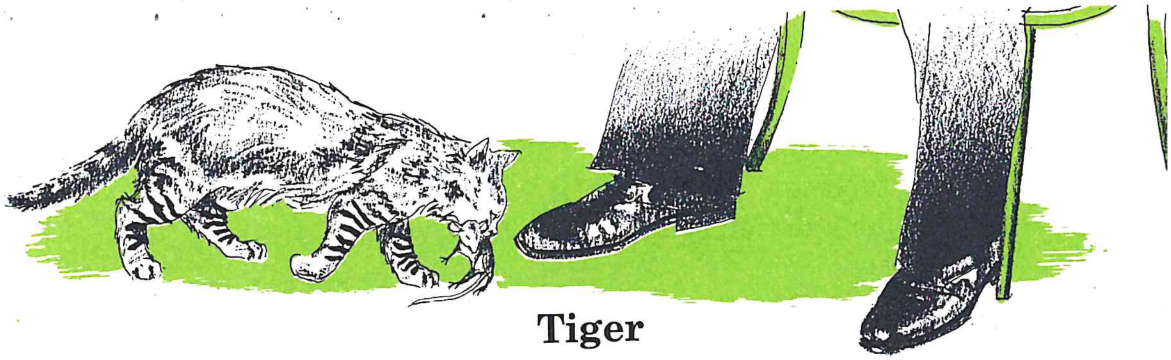
$$\begin{array}{r} 9 \\ \times 6 \\ \hline ? \end{array} \qquad \begin{array}{r} \left.\begin{array}{r} 9 \\ 9 \end{array}\right> 18 \\ +9 \\ \hline 27 \end{array} \qquad \begin{array}{r} 27 \\ +9 \\ \hline ? \\ +9 \\ \hline ? \end{array} \qquad \begin{array}{r} 9 \\ \times 5 \\ \hline 45 \\ +9 \\ \hline ? \end{array}$$

3. Can you use this for finding nine 9's?

$$\begin{array}{r} 9 \\ \times 9 \\ \hline ? \end{array} = \begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array} + \begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array} + \begin{array}{r} 9 \\ \times 1 \\ \hline 9 \end{array} = \begin{array}{r} 36 \\ 36 \\ +9 \\ \hline ? \end{array}$$

4. Some multiplication facts for review:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$
$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$



Tiger

It is not hard to believe that tigers belong to the cat family when you see Tiger, Grandpa Cone's cat. She looks so much like a tiger that you can see where she got her name.

1. If Tiger catches 4 mice each week, how many does she catch in a month?

2. Tiger drinks a pint of milk every day. How many pints does she drink in a week? How many quarts does she drink in 4 weeks?

3. Grandpa Cone can buy milk at 19¢ a quart. How much does a half gallon of milk cost him? (1 gal. = 4 qt.)

4. Tiger has 6 black stripes on each leg. How many does she have on all 4 legs?

5. Grandpa Cone bought a present for Tiger. He bought her 2 catnip balls for 17¢ each, and a small rubber ball for 8¢. How much did the 3 things cost?

6. The children like to bring things for Tiger. Danny got some liver for Tiger. It cost 9¢. How much would it cost Danny if he bought this much each day for 8 days?

7. Tiger crawls on Grandpa's bed at night. She sleeps on his feet. If she sleeps 8 hours each night, how many hours does she sleep in a week?

8. Jeff brought 8 minnows to Tiger. He had 8 times this many minnows at home. How many minnows does he have at home?

9. Grandpa Cone is 9 times as old as Tiger. If Tiger is 8 years old, how old is Grandpa Cone?

Using Multiplication Facts

Entry Blanks for a Pet Show

John's class is making the entry blanks for the pet show. They need 36 of these for dogs, cats, and other animals. They also need 36 blanks for the ducks, chickens, and other birds.

How many entry blanks are needed altogether? The long way to find the answer would be to count them by ones. You might also find it by adding 36 and 36 or by multiplying 36 by 2.

$$\begin{array}{r} 36 \\ +\,36 \\ \hline \end{array} \qquad \begin{array}{r} 36 \\ \times\,2 \\ \hline \end{array}$$

Add and multiply by using tens and ones.

Addition

$$\begin{array}{r} 3 \text{ tens} + 6 \text{ ones} \\ +\,3 \text{ tens} + 6 \text{ ones} \\ \hline 6 \text{ tens} + 12 \text{ ones} \\ \text{or} \\ 7 \text{ tens} + 2 \text{ ones} \end{array}$$

Why?

Multiplication

$$\begin{array}{r} 3 \text{ tens} + 6 \text{ ones} \\ \times\ 2 \\ \hline 6 \text{ tens} + 12 \text{ ones} \\ \text{or} \\ 7 \text{ tens} + 2 \text{ ones} = 72 \end{array}$$

You changed 12 ones to 1 ten and 2 ones. You then add the 1 ten with the 6 tens, so you have 7 tens and 2 ones.

Did you do the same changing with the ones in the multiplication that you did in the addition?

The class made 7 tens and 2 ones groups of blanks. Why do 7 tens and 2 ones make 72?

When you get a ten in the place of 10 ones and then add it with the other tens, you sometimes call it **carrying.**

1. The class wrote 3 groups of invitations. If there were 28 invitations in each group, how many were written altogether?

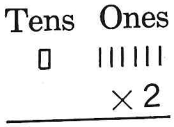
2. Jim is delivering the invitations. He is taking 2 bundles of 19 each to Miss Wolfe's room. How many invitations is he delivering on this trip?

Multiplying Tens and Ones

Prizes

John and Sharon are going to cut colored tags for the prizes. Sharon is cutting 16 blue ones and 16 white ones for first and second prizes. How many tags must she cut in all?

$\begin{array}{r} 16 \\ \times 2 \\ \hline \end{array}$ =



= $\begin{array}{r} \text{1 ten and 6 ones} \\ \times 2 \\ \hline \text{2 tens and 12 ones} \\ \text{or} \\ \text{3 tens and 2 ones} \end{array}$

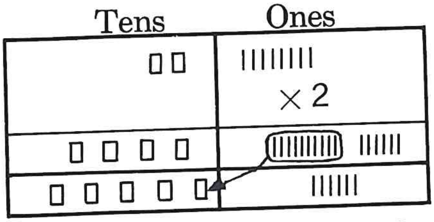
Multiply the ones.
2 × 6 ones = 12 ones.
Multiply the tens.
2 × 1 ten = 2 tens.

How did we get 3 tens and 2 ones? 3 tens and 2 ones = ? .

Multiply by writing out the tens and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
15	17	18	19	19	25	37	16
×3	×2	×3	×4	×2	×2	×3	×4

John showed Sharon how to multiply by thinking the tens and ones. First, he drew a picture to help her see what he was doing.



= 56

$\begin{array}{r} 28 \\ \times 2 \\ \hline 6 \end{array}$ Multiply the ones. 2 × 8 = 16 ones. Write 6 ones in ones place in the answer and hold the 1 ten.

$\begin{array}{r} 28 \\ \times 2 \\ \hline 56 \end{array}$ Multiply the tens. 2 × 2 tens = 4 tens. 4 tens + the 1 ten held from the ones = 5 tens.

The answer is 5 tens and 6 ones, or 56.

Practice in Multiplying

Pete had the ribbons ready for the pet show, but his dog, Cookie, ran off with them and Pete cannot find them. He is going to make new ones.

He needs 13 ribbons each of red, blue, and white. How many will he need in all?

Tell why the following will work in multiplication:

$$\begin{array}{r}13\\ \times 3\\ \hline 9\\ 30\\ \hline\end{array}$$

Multiply the ones: 3 × 3 ones = ? ones.
Multiply the tens: 3 × 1 ten (3 × 10) = ? tens.
Add to find the answer.
Pete will need ? ribbons.

1. Finish these multiplications:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
$\begin{array}{r}14\\ \times 2\\ \hline 8\\ 20\\ \hline\end{array}$	$\begin{array}{r}18\\ \times 4\\ \hline 32\\ 0\\ \hline\end{array}$	$\begin{array}{r}23\\ \times 4\\ \hline 2\\ 8\\ \hline\end{array}$	$\begin{array}{r}18\\ \times 2\\ \hline \\ 20\\ \hline\end{array}$	$\begin{array}{r}24\\ \times 3\\ \hline 12\\ \\ \hline\end{array}$	$\begin{array}{r}13\\ \times 5\\ \hline \\ 50\\ \hline\end{array}$	$\begin{array}{r}42\\ \times 2\\ \hline \\ 80\\ \hline\end{array}$	$\begin{array}{r}17\\ \times 3\\ \hline 1\\ 0\\ \hline\end{array}$

2. Multiply:

$\begin{array}{r}17\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}12\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}14\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}27\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}32\\ \times 3\\ \hline\end{array}$	$\begin{array}{r}18\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}19\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}24\\ \times 4\\ \hline\end{array}$

Do not write the exercises. Use scratch paper to put under the exercise. Then copy the answers on your paper:

3.	$\begin{array}{r}8\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}0\\ \times 9\\ \hline\end{array}$	$\begin{array}{r}7\\ \times 6\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 8\\ \hline\end{array}$	$\begin{array}{r}3\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}8\\ \times 8\\ \hline\end{array}$	$\begin{array}{r}7\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}6\\ \times 6\\ \hline\end{array}$
4.	$\begin{array}{r}7\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 3\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 9\\ \hline\end{array}$	$\begin{array}{r}8\\ \times 9\\ \hline\end{array}$	$\begin{array}{r}7\\ \times 7\\ \hline\end{array}$	$\begin{array}{r}6\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}8\\ \times 7\\ \hline\end{array}$	$\begin{array}{r}7\\ \times 6\\ \hline\end{array}$
5.	$\begin{array}{r}6\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 6\\ \hline\end{array}$	$\begin{array}{r}6\\ \times 3\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 7\\ \hline\end{array}$	$\begin{array}{r}4\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}3\\ \times 7\\ \hline\end{array}$	$\begin{array}{r}9\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}7\\ \times 2\\ \hline\end{array}$

The Sixes

Henry was having a hard time finding out what eight 6's were.

Frank said, "You remember, don't you, that two 6's are 12? Then you can easily find four 6's, because they are twice as much as two 6's. This is one way to work if you have forgotten the facts."

$$\begin{array}{r}6\\+6\\\hline 12\end{array} \text{ or } \begin{array}{r}6\\\times 2\\\hline 12\end{array} \qquad \begin{array}{c}?\\\hline 12 + 12\\\hline 6+6 \quad 6+6\end{array} \qquad \begin{array}{r}12\\+12\\\hline\end{array} = \begin{array}{r}12\\\times 2\\\hline\end{array} \text{ or } \begin{array}{r}6\\\times 4\\\hline\end{array}$$

Four 6's = ?
$4 \times 6 = ?$

Eight 6's are how many?

$$\begin{array}{c}?\\\hline 24 \quad + \quad 24\\\hline 6+6+6+6 \quad 6+6+6+6\end{array} \qquad \begin{array}{r}24\\+24\\\hline\end{array} = \begin{array}{r}24\\\times 2\\\hline\end{array} \text{ or } \begin{array}{r}6\\\times 8\\\hline\end{array}$$

Eight 6's = ?
$8 \times 6 = ?$

Three 6's are how many?

$$\begin{array}{c}?\\\hline 12 \quad +6\\\hline 6+6 \quad 6\end{array} \qquad \begin{array}{r}12\\+6\\\hline\end{array} \text{ or } \begin{array}{r}6\\\times 3\\\hline\end{array}$$

Three 6's = ?
$3 \times 6 = ?$

Six 6's are how many?

$$\begin{array}{c}?\\\hline 18 \quad + \quad 18\\\hline 6+6+6 \quad 6+6+6\end{array} \qquad \begin{array}{r}18\\+18\\\hline\end{array} = \begin{array}{r}18\\\times 2\\\hline\end{array} \text{ or } \begin{array}{r}6\\\times 6\\\hline\end{array}$$

Six 6's = ?
$6 \times 6 = ?$

Nine 6's are how many?

$$\begin{array}{c}?\\\hline 18 \quad + \quad 18 \quad + \quad 18\\\hline 6+6+6 \quad 6+6+6 \quad 6+6+6\end{array} \qquad \begin{array}{r}18\\18\\+18\\\hline\end{array} = \begin{array}{r}18\\\times 3\\\hline\end{array} \text{ or } \begin{array}{r}6\\\times 9\\\hline\end{array}$$

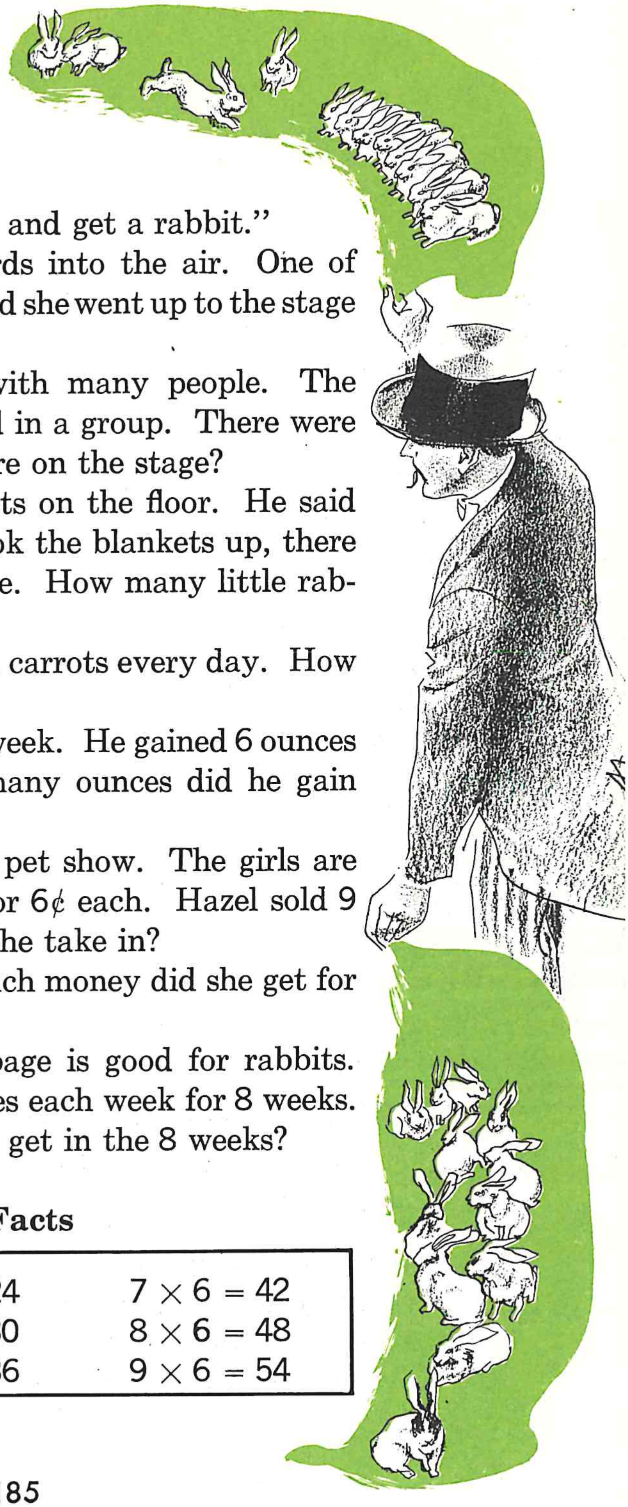
Nine 6's = ?
$9 \times 6 = ?$

See if you can find these:

a. How many are five 6's?

b. How many are seven 6's?

Whitey, the Rabbit



Hazel heard the magician say, "Anyone who gets one of these cards may come up here and get a rabbit."

The magician threw some cards into the air. One of them dropped into Hazel's lap, and she went up to the stage to get a rabbit.

1. Hazel was on the stage with many people. The magician asked 6 people to stand in a group. There were 4 groups. How many people were on the stage?

2. The magician put 2 blankets on the floor. He said some magic words. When he took the blankets up, there were 12 little rabbits on each one. How many little rabbits were there in all?

3. Hazel fed her rabbit 6 small carrots every day. How many did he eat in a week?

4. Hazel weighs Whitey each week. He gained 6 ounces each week for 3 weeks. How many ounces did he gain altogether?

5. Whitey is going to be in a pet show. The girls are selling tickets to the pet show for 6¢ each. Hazel sold 9 tickets. How much money did she take in?

6. Ida sold 7 tickets. How much money did she get for the ones that she sold?

7. Hazel found out that cabbage is good for rabbits. She gave Whitey 6 cabbage leaves each week for 8 weeks. How many leaves did the rabbit get in the 8 weeks?

The Sixes Facts

$1 \times 6 = 6$
$2 \times 6 = 12$
$3 \times 6 = 18$
$4 \times 6 = 24$
$5 \times 6 = 30$
$6 \times 6 = 36$
$7 \times 6 = 42$
$8 \times 6 = 48$
$9 \times 6 = 54$

Practice in Multiplying

1. Do not copy. Write the answers on your paper:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
9 × 1 9	8 × 9 72	6 × 6 36	9 × 4 36	8 × 5 40	9 × 2 18	8 × 8 64	6 × 4 24
6 × 8	8 × 7	6 × 5 30	9 × 5 45	9 × 3	6 × 3 18	6 × 9	8 × 6
9 × 6	6 × 7 42	0 × 8 0	9 × 9 81	9 × 7	8 × 3 24	8 × 4 32	9 × 8 72

2. Find how many:

a. six 8's = ?
b. six 6's = ?
c. eight 8's = ?
d. five 6's = ?
e. three 6's = ?
f. eight 9's = ?
g. two 9's = ?
h. six 9's = ?
i. seven 8's = ?
j. six 8's = ?
k. nine 9's = ?
l. seven 9's = ?
m. five 9's = ?
n. five 8's = ?
o. four 9's = ?

3. Multiply by writing the tens and ones:

$$\begin{array}{r} 18 \\ \times\ 2 \\ \hline \end{array} = \begin{array}{r} 1 \text{ ten and } 8 \text{ ones} \\ \times\ 2 \\ \hline 2 \text{ tens and } 16 \text{ ones} \\ \text{or} \\ 3 \text{ tens and } 6 \text{ ones} = 36 \end{array}$$

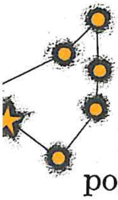
14 × 6	12 × 8	18 × 2	19 × 3	16 × 2	18 × 3	16 × 3	19 × 2

4. Multiply by thinking the tens and ones:

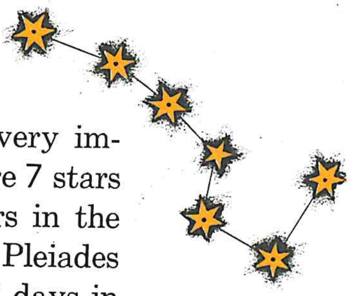
26 × 2	41 × 2	16 × 3	19 × 3	17 × 3	16 × 5	14 × 2	15 × 3

5. When multiplying 39 by 2, why do you need to hold 1 ten (or carry 1 ten) from ones place to tens place in finding the answer in its simplest form?

6. How many tens will you get in 3 × 32? in 3 × 28?



The Mystic Seven



Mother told the children that 7 has been a very important number for many, many years. There are 7 stars in the Big Dipper in the sky. There are 7 stars in the Pleiades. (The Greeks thought the 7 stars in the Pleiades were the seven daughters of Atlas.) There are 7 days in the week, and there are the Seven Wonders of the World.

Hazel and Jack thought they would like to see how much they knew about the 7's, so they figured this way:

$$\begin{array}{lr} \text{Two 7's} = & 14 \\ + \text{One 7} = & 7 \\ \hline \text{Three 7's} = & ? \end{array} \qquad \begin{array}{r} 14 \\ +7 \\ \hline ? \end{array} \quad \text{or} \quad \begin{array}{r} 7 \\ \times 3 \\ \hline ? \end{array} \qquad \begin{array}{r} \text{Three 7's} = ? \\ 3 \times 7 = ? \end{array}$$

If three 7's = 21, then six 7's are twice this amount:

$$\begin{array}{r} 21 \\ +21 \\ \hline ? \end{array} = \begin{array}{r} 21 \\ \times 2 \\ \hline ? \end{array} \qquad \begin{array}{r} 7 \\ \times 6 \\ \hline ? \end{array} \qquad \text{Six 7's} = \ ? \qquad 6 \times 7 = \ ?$$

Nine 7's are three 7's and three 7's and three 7's:

$$\begin{array}{r} 21 \\ 21 \\ +21 \\ \hline ? \end{array} \quad \text{or} \quad \begin{array}{r} 21 \\ \times 3 \\ \hline ? \end{array} \qquad \text{Nine 7's} = \ ? \qquad 9 \times 7 = \ ? \qquad \begin{array}{r} 7 \\ \times 9 \\ \hline ? \end{array}$$

Do you know what two 7's are? Then find four 7's.

Four 7's = ?　　4 × 7 = ?

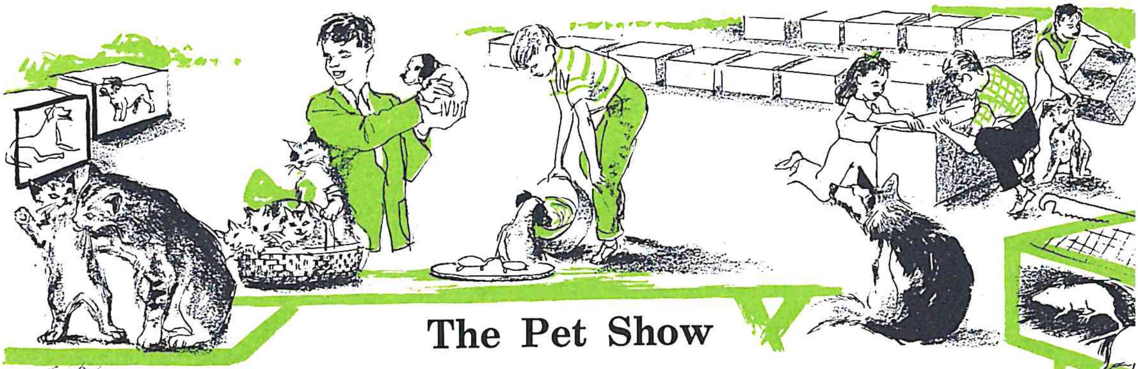
Eight 7's = 14 + 14 + 14 + 14　Why?

Eight 7's = ?　　8 × 7 = ?

$$\begin{array}{r} \left.\begin{array}{r} 14 \\ 14 \end{array}\right\rangle \\ \left.\begin{array}{r} 14 \\ +14 \end{array}\right\rangle \\ \hline ? \end{array} \begin{array}{r} 28 \\ \\ +28 \\ \hline ? \end{array} \qquad \begin{array}{r} 7 \\ \times 8 \\ \hline ? \end{array}$$

a. Find five 7's.　　**b.** Find seven 7's.

Times Facts — The 7's



The Pet Show

1. Each girl in Molly's Brownie group took 6 tickets to sell for the pet show. The tickets cost 7¢ each. If each girl sells all her tickets, how much money will she bring in?

2. Henry is making a cage for his dog. He used a wooden box. He wanted to put pieces of wood across the top, so he cut a board into two equal parts. Can you figure how long the board was before it was cut, if the two equal pieces were 14 inches long? It was ? inches.

3. The boys brought orange crates for seats. They put 7 of them in a row. There were 6 rows. How many orange crates were there altogether?

4. Each of the 9 children is bringing 7¢ to pay for the ribbon and for prizes. How much money will they have to spend?

5. Seven dogs, 7 cats, 7 white rats, and 7 turtles were entered in the show. How many animals altogether were entered in the pet show?

6. The children made the entry blanks. The 5 children made 7 blanks each. How many blanks did they make?

The Sevens Facts

1 × 7 = 7
2 × 7 = 14
3 × 7 = 21
4 × 7 = 28
5 × 7 = 35
6 × 7 = 42
7 × 7 = 49
8 × 7 = 56
9 × 7 = 63

The Fives

Mike can count by 5's very fast, but he does not know the multiplication facts for the 5's. When he sees 7 × 5, he has to count five, ten, fifteen, twenty, and so on. He has to remember how many 5's he has counted so he doesn't count more than seven 5's. He has to be so careful that he has decided to learn the facts.

Two 5's = 10
Two 5's = 10
Four 5's = ?

Four 5's = 20?
Four 5's = 20?
Eight 5's = ?

Two 5's = 10?
One 5 = 5?
Three 5's = ?

Three 5's = 15?
Three 5's = 15?
Six 5's = ?

Mike can think of these ways to find nine 5's:

a.
Three 5's = 15?
Three 5's = 15?
Three 5's = 15?
Nine 5's = 45?

b.
Ten 5's = 50
Nine 5's = 50 − 5 = ?

c.
Six 5's = 30?
Three 5's = 15?
Nine 5's = ?

He knows that five 5's = 25 because 5 nickels = a quarter.

Seven 5's: Five 5's = 25?
Two 5's = 10
Seven 5's = ?

1. What will 9 bars of candy cost at 5¢ a bar?

2. Mike bought 7 pencils for school. He paid 5¢ for each one. How much did he pay for them?

3. Mike's uncle said he would trade him a quarter for his 6 nickels. Should Mike trade? Why, or why not?

Sweet Music Makes the Day Pleasant

Molly has 2 canaries. They sing to her in the morning when she is cleaning their cage. They whistle and sing to her when she gets home from school.

1. Molly paid $2 for each canary. How much did she pay for both of them?

2. The bird seed Molly buys is 14¢ a package. Find the cost of 2 packages of seed.

3. Molly belongs to the Bird Club. She bought bird books for each of her 3 friends for their birthdays. The bird books cost 29¢ each. How much did the 3 books cost?

4. The Bird Club boys and girls were divided into groups for their Sunday walks in the woods. There were 7 groups with 8 children in each group. How many children belong to the Bird Club?

5. Another Bird Club takes walks in the woods to see the wild birds. This club has 7 groups with 5 children in each group. How many children belong to the club?

Multiply:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
17 × 5	14 × 5	25 × 2	40 × 5	16 × 5	12 × 5	19 × 5	18 × 5
35 × 3	15 × 5	25 × 3	15 × 2	13 × 5	15 × 1	10 × 5	11 × 5

The Fives Facts

1 × 5 = 5
2 × 5 = 10
3 × 5 = 15
4 × 5 = 20
5 × 5 = 25
6 × 5 = 30
7 × 5 = 35
8 × 5 = 40
9 × 5 = 45

Using the 5's

More about Multiplication

Philip wanted a dog more than anything! He is earning part of the money by running errands so that he can buy a dog.

Philip went to the postoffice to buy stamps for Mrs. Stone. He is going to buy thirteen 3¢ stamps. He needs to know how much they will cost. He thought: "Thirteen has the parts 10 and 3. Three stamps cost 9¢. Ten stamps cost 10 × 3¢ = 30¢. Then 9¢ and 30¢ are 39¢.

$$\boxed{\begin{array}{r} 3\text{¢} \\ \times\ 13 \\ \hline \end{array}}$$

If Philip had used paper and pencil to figure this, his work could have been like this:

$$\begin{array}{r} 3\text{¢} \\ \times\ 13 \\ \hline 9 \\ 30 \\ \hline 39\text{¢} \end{array}$$

3 × 3 ones = 9 ones. Write 9 in ones place as you see here.

Then the 1 ten × the 3 ones is really 10 × 3 ones. So, 10 × 3 ones = 30 ones or 3 tens and 0 ones.

Write 3 in tens place and 0 in ones place.

Adding, he gets 39¢.

Philip met David on the way to the postoffice. David was going to buy 12 six-cent airmail stamps.

Philip helped David figure how much they would cost.

$$\boxed{\begin{array}{r} 6\text{¢} \\ \times\ 12 \\ \hline \end{array}}$$

$$\begin{array}{r} 6\text{¢} \\ \times\ 12 \\ \hline 12 \\ 60 \\ \hline 72\text{¢} \end{array}$$

2 × 6 ones = 12 ones, or 1 ten and 2 ones. Write the 2 in ones place and the 1 ten in tens place as shown here.

1 ten × 6 ones or 10 × 6 ones = 60 ones = 6 tens and 0 ones. Write the 6 in tens place and 0 in ones place.

Adding, the answer is 72. The stamps cost 72¢.

Multiply:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
5¢	8¢	4¢	7¢	9	3	2	9
× 11	× 13	× 12	× 12	× 13	× 15	× 16	× 14

Minnows for Midget

It takes most of Steve's allowance to buy minnows for Midget. She wants to eat all the time.

Steve fed Midget 6 minnows each day for 13 days. Let's help him figure out how many minnows he fed her during this time.

$$\begin{array}{r} 6 \\ \times\ 13 \\ \hline \end{array}$$

Steve knew how to find the answer by thinking that 13 is 10 and 3. First, you take 3 × 6 ones, and then 10 × 6 ones.

$$\begin{array}{r} 6 \\ \times\ 13 \\ \hline 18 \\ 6 \\ \hline 78 \end{array}$$

3 × 6 ones = 18 ones. Write 8 in ones place and 1 in tens place as you see here. Now 10 × 6 ones = 60 ones = 6 tens. Write 6 in tens place as shown in the example.

Adding, the answer is 7 tens and 8 ones or 78. Why?

Multiply, using the tens and ones as shown above:

a.	b.	c.	d.	e.	f.	g.	h.
5	4	5	7	8	8	9	5
× 12	× 16	× 11	× 12	× 11	× 13	× 10	× 15

Try another problem where you will use a still shorter way.

$$\begin{array}{r} 8 \\ \times\ 12 \\ \hline 96 \end{array}$$

If Steve gave Midget 8 minnows a day for 12 days, how many did he give her altogether for this many days?

2 × 8 ones = 16 ones. Write 6 in ones place in the answer and hold the 1 ten.

10 × 8 ones = 80 ones, or 8 tens. 8 tens + 1 ten (held) = 9 tens. Write 9 in tens place in the answer.

Multiply:

a.	b.	c.	d.	e.	f.	g.	h.
8	5	7	6	5	4	2	3
× 12	× 13	× 14	× 10	× 14	× 15	× 18	× 16

Changing Places with Numbers in Multiplication

Edith and Steve did some problems at home after dinner. Edith wanted to know how many monkeys there were in the zoo if there were 24 cages with 3 monkeys in each cage.

Steve said, "There are 72 monkeys in all. You figure this way: 24 has the parts 20 and 4. We first think what 4 × 3 ones is, and then 20 × 3 ones."

Steve showed Edith how to put the figures on paper:

$$\begin{array}{r} 3 \\ \times 24 \\ \hline 12 \\ 6 \\ \hline 72 \end{array}$$

You think: 4 × 3 ones = 12 ones.

20 × 3 ones = 60 ones, or 6 tens. You can say 2 tens × 3 ones = 6 tens. Why?

When you add you get 72. Why?

Edith decided to multiply like this:

$$\begin{array}{r} 24 \\ \times 3 \\ \hline 12 \\ 60 \\ \hline 72 \end{array}$$

24 = 20 + 4.

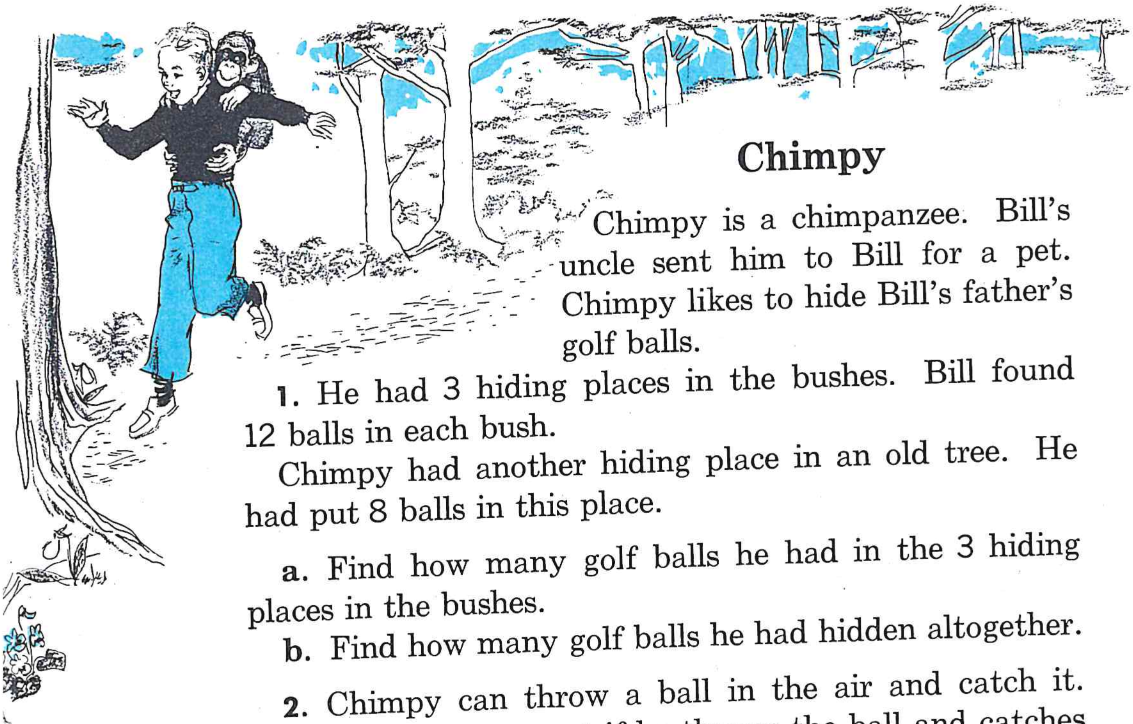
3 × 4 ones = 12 ones, or 1 ten and 2 ones.

3 × 20 ones = 60 ones, or 6 tens and 0 ones.

Could she multiply this way and write 6 tens instead of 6 tens and 0 ones? (Or, could she say 3 × 2 tens = 6 tens?)

Steve said, "You aren't thinking what the figures mean. We are trying to find out how many monkeys there are in 24 cages. Remember, there are 24 cages with 3 monkeys in each of the cages. The size of the group is 3 and there are 24 of them. To show the meaning in multiplication, we always place the number that tells how many there are in the *equal groups* as the number to be multiplied. The way you have it down, it is 3 groups of 24."

Do you think that it makes any difference which way you write a multiplication, just so long as the answer is labeled? (7 × 6¢ gives the same as 6 × 7¢.)



Chimpy

Chimpy is a chimpanzee. Bill's uncle sent him to Bill for a pet. Chimpy likes to hide Bill's father's golf balls.

1. He had 3 hiding places in the bushes. Bill found 12 balls in each bush.

Chimpy had another hiding place in an old tree. He had put 8 balls in this place.

a. Find how many golf balls he had in the 3 hiding places in the bushes.

b. Find how many golf balls he had hidden altogether.

2. Chimpy can throw a ball in the air and catch it. Bill gives him a peanut if he throws the ball and catches it. He has 14 peanuts hidden under a rock and 12 hidden in each of the 3 caves down by the pond. How many peanuts does he have altogether?

3. Chimpy likes to play "Monkey see, monkey do." He does just what Bill does. He takes a step when Bill does. Bill took 5 steps; Chimpy took 5 steps. Bill took 6 steps backward; Chimpy took 6 steps backward. Bill took 8 steps sideways; Chimpy took 8 steps sideways. Find how many steps Bill took.

4. Bill's mother had two dozen bananas. If Bill ate 7 of them and Chimpy ate twice as many, how many bananas were left?

5. Bill and Chimpy are lining up for a race to the tree 30 feet away. Chimpy ran 12 feet when Bill passed him. Chimpy jumped on Bill's back and rode the rest of the way. How far did Chimpy ride?

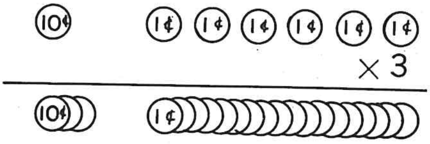
Using Our Multiplication

Joan bought 3 bags of jelly beans to treat everyone after the pet show. Each bag of jelly beans cost 16¢. How much did the three bags cost?

$$\begin{array}{r}16\text{¢}\\ \times 3\\ \hline ?\end{array}$$

Joan figured it this way:

$$\begin{array}{r}16\text{¢}\\ \times 3\\ \hline\end{array}$$



or

$$\begin{array}{r}16\text{¢}\\ \times 3\\ \hline 48\text{¢}\end{array}$$

Multiply the ones (cents).

3 × 6¢ = 18¢

18¢ = 1 ten (dime) and 8 cents (ones).

Joan wrote 8 in ones (cents) place and held the 1 ten (dime).

Multiply the tens (dimes).

3 × 1 ten = 3 tens. 3 tens + 1 ten (held) = 4 tens (or dimes). 4 tens (dimes) and 8 ones (cents) = 48¢.

1. Multiply, after drawing a picture to show how many pennies and dimes you have after multiplying:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**
$\begin{array}{r}16\text{¢}\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}18\text{¢}\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}24\text{¢}\\ \times 3\\ \hline\end{array}$	$\begin{array}{r}25\text{¢}\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}33\text{¢}\\ \times 4\\ \hline\end{array}$	$\begin{array}{r}17\text{¢}\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}19\text{¢}\\ \times 3\\ \hline\end{array}$

2. Multiply, holding the tens:

$\begin{array}{r}28\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}35\\ \times 2\\ \hline\end{array}$	$\begin{array}{r}14\\ \times 3\\ \hline\end{array}$	$\begin{array}{r}16\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}12\\ \times 5\\ \hline\end{array}$	$\begin{array}{r}18\\ \times 3\\ \hline\end{array}$	$\begin{array}{r}22\\ \times 6\\ \hline\end{array}$

Practice in Multiplying

1. Multiply, holding the tens:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
$\begin{array}{r} 14 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 15 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 42 \\ \times 5 \\ \hline \end{array}$
$\begin{array}{r} 19 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 15 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 19 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 35 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 13 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 38 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 19 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ \times 2 \\ \hline \end{array}$

2. Hal fed his pet turtle 3 flies each day for 13 days. How many flies did his turtle get?

3. Hazel fed her rabbits 12 cabbage leaves each day for a week. How many cabbage leaves did they get in all?

4. It costs Bill 6¢ a day to buy liver for his cats. How much does he spend for liver in 2 weeks?

5. Write only the answers on your paper:

$\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$	$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$	$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$	$\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$	$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$	$\begin{array}{r} 0 \\ \times 9 \\ \hline 9 \end{array}$	$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$	$\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$
$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$	$\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$	$\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$	$\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$	$\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$	$\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$	$\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$	$\begin{array}{r} 8 \\ \times 5 \\ \hline 40 \end{array}$
$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$	$\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$	$\begin{array}{r} 5 \\ \times 3 \\ \hline 15 \end{array}$	$\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$	$\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$	$\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$	$\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$	$\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$
$\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$	$\begin{array}{r} 6 \\ \times 7 \\ \hline 42 \end{array}$	$\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$	$\begin{array}{r} 8 \\ \times 3 \\ \hline 24 \end{array}$	$\begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array}$	$\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$	$\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$	$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$
$\begin{array}{r} 4 \\ \times 8 \\ \hline 32 \end{array}$	$\begin{array}{r} 9 \\ \times 0 \\ \hline 9 \end{array}$	$\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$	$\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \end{array}$	$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$	$\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$	$\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$	$\begin{array}{r} 0 \\ \times 2 \\ \hline 2 \end{array}$
$\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$	$\begin{array}{r} 2 \\ \times 9 \\ \hline 18 \end{array}$	$\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$	$\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$	$\begin{array}{r} 4 \\ \times 5 \\ \hline 20 \end{array}$	$\begin{array}{r} 3 \\ \times 4 \\ \hline 12 \end{array}$	$\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$	$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$
$\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$	$\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$	$\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$	$\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$	$\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$	$\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$	$\begin{array}{r} 4 \\ \times 2 \\ \hline 8 \end{array}$	$\begin{array}{r} 3 \\ \times 5 \\ \hline 15 \end{array}$

Checking Multiplication

Jack had this problem. He wanted to be sure it was right. He said, "I can be sure it is right if I count by 5's like this: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60. But I must keep count of how many groups of 5 I have counted. Twelve 5's are 60."

$$\begin{array}{r} 5 \\ \times\ 12 \\ \hline \end{array}$$

Jack thought of another way he could check this same problem. He wrote down twelve 5's, and added them. He was glad to know you could check multiplication by adding.

$$\begin{array}{r} 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ +\ 5 \\ \hline \end{array}$$

Jack's mother thought of another way to check multiplication. She said to change the numbers around like this:

$$\begin{array}{r} 14 \\ \times\ 4 \\ \hline 56 \end{array} \quad \text{to} \quad \begin{array}{r} 4 \\ \times\ 14 \\ \hline 56 \end{array}$$

If you get the same answer both ways, your answer is right.

From what you have been studying about the meaning of multiplication, why is it a good check to change the places of the two numbers?

1. Multiply and check:

$$\begin{array}{r} 3 \\ \times\ 12 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ \times\ 8 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ \times\ 6 \\ \hline \end{array} \qquad \begin{array}{r} 6 \\ \times\ 11 \\ \hline \end{array}$$

2. Multiply and check by addition:

$$\begin{array}{r} \textbf{a.} \\ 19 \\ \times\ 4 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{b.} \\ 15 \\ \times\ 5 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{c.} \\ 29 \\ \times\ 9 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{d.} \\ 12 \\ \times\ 7 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{e.} \\ 25 \\ \times\ 4 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{f.} \\ 24 \\ \times\ 3 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{g.} \\ 30 \\ \times\ 3 \\ \hline \end{array} \qquad \begin{array}{r} \textbf{h.} \\ 18 \\ \times\ 5 \\ \hline \end{array}$$

3. Multiply and check by changing the numbers around in the exercise:

$$\begin{array}{r} 14 \\ \times\ 8 \\ \hline \end{array} \qquad \begin{array}{r} 11 \\ \times\ 3 \\ \hline \end{array} \qquad \begin{array}{r} 22 \\ \times\ 3 \\ \hline \end{array} \qquad \begin{array}{r} 32 \\ \times\ 3 \\ \hline \end{array} \qquad \begin{array}{r} 17 \\ \times\ 2 \\ \hline \end{array} \qquad \begin{array}{r} 21 \\ \times\ 3 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ \times\ 4 \\ \hline \end{array} \qquad \begin{array}{r} 25 \\ \times\ 3 \\ \hline \end{array}$$

Using Addition as a Check of Multiplication

Multiplying Hundreds

$$\begin{array}{r} 142 \\ \times\, 2 \\ \hline \end{array} = \begin{array}{ccc} \text{Hundreds} & \text{Tens} & \text{Ones} \\ \square & \square\square\square\square & |\,| \\ & & \times\, 2 \\ \hline \end{array} = \begin{array}{r} 1 \text{ hundred} + 4 \text{ tens} + 2 \text{ ones} \\ \times\, 2 \\ \hline \end{array}$$

Will the answer be more than 200? less than 300? Why?

$$\begin{array}{r} 142 \\ \times\, 2 \\ \hline 284 \end{array}$$

Multiply the ones. 2 × 2 ones = 4 ones. Write 4 in ones place in the answer.

Multiply the tens. 2 × 4 tens = 8 tens. Write 8 in tens place in the answer.

Multiply the hundreds. 2 × 1 hundred = 2 hundreds.

Write 2 in hundreds place in the answer.

The answer is 284.

1. Multiply:

$$\begin{array}{cccccccc} \textbf{a.} & \textbf{b.} & \textbf{c.} & \textbf{d.} & \textbf{e.} & \textbf{f.} & \textbf{g.} & \textbf{h.} \\ 132 & 114 & 112 & 124 & 110 & 432 & 414 & 111 \\ \times\, 3 & \times\, 2 & \times\, 4 & \times\, 2 & \times\, 8 & \times\, 2 & \times\, 2 & \times\, 6 \end{array}$$

$$\begin{array}{r} 129 \\ \times\, 3 \\ \hline \end{array} = \begin{array}{ccc} \text{Hundreds} & \text{Tens} & \text{Ones} \\ \square & \square\square & |||||||||\\ & & \times\, 3 \\ \hline \end{array} = \begin{array}{r} 1 \text{ hundred} + 2 \text{ tens} + 9 \text{ ones} \\ \times\, 3 \\ \hline \end{array}$$

$$\begin{array}{r} 129 \\ \times\, 3 \\ \hline 7 \end{array}$$

Multiply the ones. 3 × 9 ones = 27 ones. 27 ones = 2 tens and 7 ones.

Write the 7 in ones place.

Hold the 2 tens to put with the other tens. (3 × 2 tens = 6 tens.)

Finish the work.

2. Multiply:

$$\begin{array}{cccccccc} 128 & 149 & 136 & 127 & 217 & 328 & 410 & 218 \\ \times\, 4 & \times\, 2 & \times\, 2 & \times\, 3 & \times\, 4 & \times\, 2 & \times\, 2 & \times\, 3 \end{array}$$

Money Values in Multiplication

It costs Bill 48¢ a week to feed Chimpy. What will Bill spend for Chimpy's food in 4 weeks?

You could use addition to get the answer. How? But let's use multiplication. 48¢ can be 4 dimes and 8 pennies.

$$\begin{array}{r} 48\text{¢} \\ \times 4 \\ \hline 2 \end{array}$$

We will call them tens and ones. 4 × 8 ones = 32 ones. Write 2 in ones place in the answer and hold the 3 tens. Why?

$$\begin{array}{r} 48\text{¢} \\ 4 \\ \hline 192\text{¢} \end{array}$$

4 × 4 tens = 16 tens. 16 tens + 3 tens (held) = 19 tens.

Write 9 in tens place and 1 in hundreds place in the answer. Why?

The answer is first seen as 192 cents. How will you write it if you use the dollar sign ($)? 192¢ is more than 100¢ or $1.00. How much more than 100¢ or $1 is 192¢?

When you use the $ sign, where do you put the period (.) as a cents sign? Is it correct to write 192¢ as $1.92? Multiply $1.23 by 3.

The answer will be more than $3 and less than $4. Why?

$$\begin{array}{r} \$1.23 \\ \times 3 \\ \hline .69 \end{array}$$

Now 3 × 3 = 9. They are ones. Why? 3 × 2 = 6. They are tens. Why?

Because the 23 (in $1.23) is in cents, would you say that the 69 is cents? If so, then the period for cents should be placed at the left of the 6.

$$\begin{array}{r} \$1.23 \\ \times 3 \\ \hline \$3.69 \end{array}$$

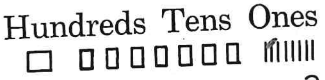
Now 3 × 1 = 3. Where is the 3 placed in the answer? Why do we have 3 dollars?

1. Multiply:

a.	b.	c.	d.	e.	f.	g.	h.
63¢	58¢	$.96	$1.25	$.75	50¢	$1.50	$1.75
×2	×2	×3	×4	×4	×6	×2	×3

Do You Understand?

$$\begin{array}{r} 178 \\ \times 3 \\ \hline \end{array} =$$



$$\begin{array}{r} \times 3 \\ \hline \end{array} = \begin{array}{r} 1 \text{ hundred} + 7 \text{ tens} + 8 \text{ ones} \\ \times 3 \\ \hline \end{array}$$

The answer will be more than 500. Why? Multiply the ones. 3 × 8 ones = 24 ones. Write 4 in ones place. Hold the 2 tens.

$$\begin{array}{r} 178 \\ \times 3 \\ \hline 4 \end{array}$$

Multiply the tens. 3 × 7 tens = 21 tens. 21 tens and 2 tens (held from the ones) = 23 tens. 23 tens = 2 hundreds and 3 tens. Write 3 in tens place. Hold the 2 hundreds.

$$\begin{array}{r} 178 \\ \times 3 \\ \hline 34 \end{array}$$

Multiply the hundreds. 3 × 1 hundred = 3 hundreds. Add the 2 hundreds you held from the 23 tens. 3 hundreds and 2 hundreds = 5 hundreds. Write 5 in hundreds place.

The answer is 534.

$$\begin{array}{r} 178 \\ \times 3 \\ \hline 534 \end{array}$$

1. Multiply:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
148	317	129	144	156	130	117	114
× 4	× 2	× 3	× 2	× 4	× 6	× 6	× 3

2. Fill the blanks:

a. 28 tens = ? hundreds and ? tens.
b. 17 tens = ? hundreds and ? tens.
c. 170 = ? hundreds, ? tens, and ? ones.

3. Change these to better answers:

a. 5 hundreds, 17 tens, and 11 ones.
b. 1 hundred, 25 tens, and 15 ones.

4. Bob's father raises rabbits. There are 129 rabbits in one row of houses. There are the same number in the other row. How many rabbits are there in all?

Practice Exercises

Multiply:

	a.	b.	c.	d.	e.	f.	g.	h.	i.
1.	27 × 3	47 × 2	81 × 1	19 × 5	37 × 2	13 × 7	17 × 6	10 × 8	26 × 3
2.	128 × 3	5 × 16	37 × 2	129 × 3	218 × 3	14 × 7	121 × 4	5 × 13	117 × 2

Add:

3.	26 19 35	18 8 35	45 17 24	19 9 17	18 24 15	25 17 36	17 16 39	36 18 29	10 5 17
4.	76 19 8	10 36 27	17 28 16	34 10 19	28 17 19	115 19 147	124 217 120	116 135 219	133 218 17

Subtract:

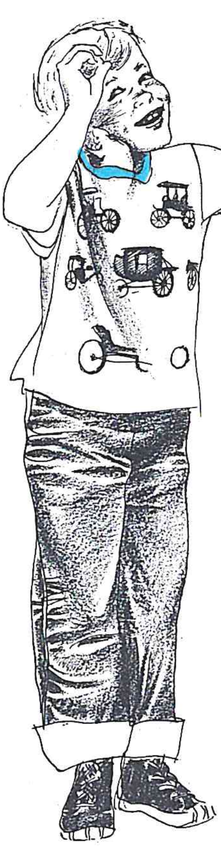
5.	56 18	89 76	34 18	17 9	20 15	51 19	71 67	67 34	80 15
6.	71 38	80 71	54 18	38 10	72 45	118 40	190 72	270 131	373 257

Divide:

7.	$5\overline{)45}$	$4\overline{)28}$	$6\overline{)24}$	$5\overline{)30}$	$7\overline{)14}$	$5\overline{)35}$	$7\overline{)56}$	$8\overline{)32}$
8.	$6\overline{)30}$	$5\overline{)45}$	$4\overline{)32}$	$9\overline{)72}$	$4\overline{)36}$	$9\overline{)81}$	$5\overline{)40}$	$3\overline{)18}$

Multiply:

9.	\$1.22 × 3	\$2.45 × 4	\$1.60 × 4	\$1.20 × 5	\$1.05 × 2	\$.25 × 5	\$1.25 × 4	.75 × 6



Terry and Perry

Terry and Perry are white rats. They belong to Ken. Their favorite game is to run up the outside of Ken's pant leg and under his shirt to see which one can come out at his collar first.

1. Ken put 6 ounces of water in each of the 3 drinking bottles for the rats. How many ounces did he put in the bottles?

2. The rats like sunflower seeds. Ken gave them a half cup each day. How many cups did he give them in 2 weeks?

3. Ken pays 17¢ for $\frac{1}{2}$ pound of peanuts mixed with sunflower, pumpkin, and squash seeds. How much would he pay for a pound?

4. Terry and Perry had babies. They had 6 babies the first time, then 4 babies, and then 5 babies the last time. How many more or less than 1 dozen did they have altogether?

5. When they had their babies, Ken gave the babies a cup of milk every day. How many cups did he give them in 10 days? How many quarts? (There are 4 cups in a quart.)

6. Terry and Perry hide things. Ken found 13 acorns in a corner, 5 small sticks in the closet, 7 bottle caps under the rug, and 8 rubber bands under the bed. How many things did they hide?

7. Multiply:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
42	17	193	67	19	30	117	36
× 4	× 8	× 5	× 2	× 5	× 7	× 4	× 7

Reviewing Multiplication Facts

1. Copy and multiply:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
6 3	8 8	9 4	4 4	6 9	8 7	9 7	9 5	8 9
4 7	8 6	4 5	8 4	6 8	8 5	9 6	8 3	9 9
4 6	9 8	6 5	6 7	4 8	6 4	4 9	8 1	5 2

2. Multiply:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**
19 × 2	12 × 5	18 × 2	16 × 2	14 × 3	15 × 2	17 × 2	12 × 5	13 × 6

3. Write the missing numbers:

a. Eight 6's = ?
b. Eight 4's = ?
c. Nine 9's = ?
d. Seven 9's = ?
e. Seven 8's = ?
f. Six 6's = ?
g. Nine 6's = ?
h. Five 9's = ?

4. Write the missing numbers:

1 × 6 = 6 ?
2 × 6 = 12 ?
3 × 6 = 18 ?
4 × 6 = 24 ?
5 × 6 = 30 ?
6 × 6 = 36 ?
7 × 6 = 42 ?
8 × 6 = 48 ?
9 × 6 = 54 ?

1 × 7 = 7 ?
2 × 7 = 14 ?
3 × 7 = 21 ?
4 × 7 = 28 ?
5 × 7 = 35 ?
6 × 7 = 42 ?
7 × 7 = 49 ?
8 × 7 = 56 ?
9 × 7 = 63 ?

1 × 8 = 8 ?
2 × 8 = 16 ?
3 × 8 = 24 ?
4 × 8 = 32 ?
5 × 8 = 40 ?
6 × 8 = 48 ?
7 × 8 = 57 ?
8 × 8 = 64 ?
9 × 8 = 72 ?

1 × 9 = 9 ?
2 × 9 = 18 ?
3 × 9 = 27 ?
4 × 9 = 36 ?
5 × 9 = 45 ?
6 × 9 = 54 ?
7 × 9 = 63 ?
8 × 9 = 72 ?
9 × 9 = 81 ?

Unit Review

1. What are the names of the places in a 2-place number?

2. How many ones does it take to make a ten? to make 3 tens?

3. How many tens are there in 80? in 30? in 46?

4. When multiplying numbers, why is it usually best to multiply the ones first?

5. Give all the multiplication facts about 5 (from $1 \times 5 = ?$ to $9 \times 5 = ?$).

6. Write the answers to the following:

$1 \times 7 = ?$ $2 \times 7 = ?$ $3 \times 7 = ?$ $4 \times 7 = ?$ $5 \times 7 = ?$
$6 \times 7 = ?$ $7 \times 7 = ?$ $8 \times 7 = ?$ $9 \times 7 = ?$

7. How many are ten 8's? ten 6's? ten 9's? ten 5's?

8. Sometimes you can use either addition or multiplication in finding the answer to a problem. When may this happen? Which way is shorter?

9. Multiply:

a.	b.	c.	d.	e.	f.	g.	h.
24	32	26	48	$.33	17	$.75	$.20
× 2	× 3	× 3	× 2	× 5	× 5	× 6	× 4

10. Multiply and check your answers:

6	8	4	7	5	9	4	5
15	18	13	14	16	12	19	17

11. If you want to multiply 4 by 24, why can you change the numbers so that you can multiply 24 by 4 and get the right number for the answer? Do you have to be careful about the labels for the numbers and the answer?

$$\begin{array}{r} 4 \\ \times\, 24 \\ \hline \end{array} \quad \text{or} \quad \begin{array}{r} 24 \\ \times\, 4 \\ \hline \end{array}$$

Unit Test

1. Facts you should know. Write only the answers:

Eight 9's = ?
Six 5's = ?
Nine 8's = ?
Three 3's = ?
Six 4's = ?
Seven 9's = ?
Four 6's = ?
Five 4's = ?
Four 3's = ?
Eight 8's = ?
Four 9's = ?
Four 8's = ?
Six 6's = ?
Seven 8's = ?
Five 9's = ?
Eight 6's = ?
Seven 5's = ?
Nine 9's = ?
Five 6's = ?
Nine 6's = ?
Eight 5's = ?
Six 8's = ?
Seven 6's = ?
Nine 5's = ?

2. Jerry fed his rabbits 7 carrots every day for a week. How many carrots did he feed them in one week?

3. Esther saw 3 groups of giraffes at the zoo. There were 4 giraffes in each group. How many were there in all?

4. Barry needs 6 feathers for each Indian headdress that he makes. How many feathers would he need for 12 headdresses?

5. Jack saw 16 monkeys in each of the 3 trees on Monkey Island. How many monkeys were there in all 3 trees?

6. Alice fed 7 peanuts to each of the 9 monkeys at the fence. How many peanuts did she feed these monkeys?

7. Multiply and check your work in any way you wish:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
31	$1.14	$.17	$.88	$1.27	19	17	8
× 3	× 4	× 3	× 5	× 2	× 5	× 5	× 12

8. Use these exercises to show that multiplication and addition are related:

32	15	17	18	25	17	43	19
× 3	× 4	× 4	× 5	× 3	× 4	× 2	× 3

UNIT 7

Having Fun and Doing Things in Groups

Look at the picture on the opposite page. Do you know about the clubs or groups to which these children might belong? Do you belong to a club or a group like the Cub Scouts or the Brownies? Do you belong to more than one group?

Pete is a Cub Scout. He thinks the snow trips the Cubs take are loads of fun — and you should see him collecting old newspapers to sell so that the Scouts will have money for their snow trips.

Then there are the Bluebirds. Just wait until you hear about all the things they do. Mary's uncle says, "Those birds have fine feathers," and I guess he is right.

Did you ever buy a Bluebird or a Cub Scout outfit? How did you use arithmetic when you bought it?

Do you pay dues to your club? What need would you have for arithmetic in doing this?

Kate and Mike and 16 other children belong to a Bird Club. All the children are putting their money together to buy bird call whistles. If each boy and girl is going to bring an equal amount for bird whistles that cost $9 altogether, how would you find how much each child must bring?

Do you ever bring the refreshments for your club meetings? How would you find how many cups of punch each person could have from 2 gallons of punch?

How would you find the number of ice cream cones that could be bought with 35¢ if each cone cost 7¢?

Do you collect rocks? If you wanted to give $\frac{1}{2}$ of your rocks to your friend, do you know how you would find how many rocks you would give him?

Can you tell why division is sometimes called a short process of subtraction? Could you prove it by subtracting 12's to find how many dozens there are in 84 rolls?

How Well Do You Remember Division?

Sometimes we forget some of the things about division. Do you remember studying the number 24? If you wanted to divide it into 2 equal parts, you could use ones as counters. If you use ones and tens counters, you have:

$$24 = \overset{\text{Tens}}{▯▯} \text{ and } \overset{\text{Ones}}{||||} \quad \text{Then, } 2\overline{)24} = \overset{\text{Tens}}{▯} \text{ and } \overset{\text{Ones}}{||} = 12.$$

A still shorter way is to write the tens and ones:

$$\begin{array}{rcl} & & \text{1 ten and 2 ones} \;=\; 12 \\ 2\overline{)24} & = & 2\overline{)\text{2 tens and 4 ones}} \end{array}$$

You can also do the work by thinking tens and ones:

$$\begin{array}{r} 12 \\ 2\overline{)24} \\ \underline{2} \\ 4 \\ \underline{4} \end{array}$$

The answer will be more than 10. Why? 2 tens ÷ 2 = 1 ten. Why is a 2 written under the 2 in 24? Why is the 4 placed under the line? 4 ones ÷ 2 = 2 ones. Why is a 4 written under the other 4?

Why are the figures placed as they are in the answer?

1. Draw 30 marbles on your paper. How many will there be in each of the two equal parts of 30 marbles? in each of the three equal parts?

2. If you divide a group of things into equal parts, do you label your answer things or groups?

(As in, $6\overline{)48 \text{ cards}}$ = ?.)

3. If you are finding how many groups of things (each of the same size) there are in a larger group of things, will your answer be things or groups?

(As in, $6 \text{ cards}\overline{)48 \text{ cards}}$ = ?.)

4. Can you divide $2\overline{)34}$ without changing the tens and ones? Why?

Make Sure That You Understand

Joan and two of her friends in the Brownies are going to sell 36 boxes of Girl Scout cookies. They are going to divide the boxes of cookies evenly among the 3 of them.

Use counters in the division:

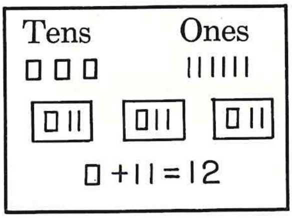
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

If you count these out into 3 equal groups, you have:

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

By counting, you find that each girl will have 12 boxes.

You can also use tens and ones counters. Divide these counters into 3 equal groups. How many tens and how many ones are there in each group? The answer is ?.



Divide by writing tens and ones:

$$3\overline{)36} = \begin{array}{r} \text{1 ten and 2 ones} \\ 3\overline{)\text{3 tens and 6 ones}} \end{array} = 12$$

Divide by thinking tens and ones:

$$\begin{array}{r} 1 \\ 3\overline{)36} \\ \underline{3} \end{array}$$

3 tens divided into 3 equal parts gives 1 ten in each part. Write the 1 above the 3 tens. Why? Write 3 under the 3 tens to show that you have used them.

$$\begin{array}{r} 12 \\ 3\overline{)36} \\ \underline{3} \\ 6 \\ \underline{6} \end{array}$$

You have 6 ones which you still have to divide. 6 ones divided into 3 equal parts gives 2 ones in each part. Put 2 over the 6 ones in the answer. Write the 6 under the 6 ones to show that you have used them. The answer is 12.

Practice—Dividing Tens and Ones

1. Divide 68 into two equal parts, writing the tens and ones:

$$2\overline{)68} \;=\; \begin{array}{l} \text{3 tens and 4 ones} \\ 2\overline{)\text{6 tens and 8 ones}} \end{array} \;=\; 34 \qquad \text{Why?}$$

Thinking the place values:

$$\begin{array}{r} 3 \\ 2\overline{)68} \\ \underline{6} \\ 8 \end{array}$$

There will be a figure in tens place in the answer. Why? If you divide 6 tens into two equal parts, you have 3 tens in each part. Write the 3 above the 6 in tens place. Write 6 below the 6 to show you have used all 6 of the tens.

$$\begin{array}{r} 34 \\ 2\overline{)68} \\ \underline{6} \\ 8 \\ \underline{8} \end{array}$$

You have 8 ones left to divide into two equal parts. You get 4 ones in each part. Write the 4 over the 8 in ones place. Write 8 below the 8 to show you used 8 ones.

Your answer is 34.

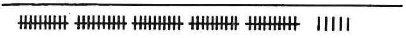
Divide, writing the tens and ones:

	a.	b.	c.	d.	e.	f.	g.	h.
2.	$2\overline{)88}$	$4\overline{)48}$	$3\overline{)69}$	$5\overline{)55}$	$3\overline{)66}$	$8\overline{)88}$	$4\overline{)44}$	$2\overline{)86}$

Divide, thinking the tens and ones:

3.	$2\overline{)66}$	$2\overline{)84}$	$2\overline{)64}$	$3\overline{)66}$	$3\overline{)96}$	$2\overline{)22}$	$2\overline{)82}$	$3\overline{)33}$
4.	$3\overline{)69}$	$2\overline{)86}$	$3\overline{)90}$	$4\overline{)80}$	$2\overline{)42}$	$3\overline{)63}$	$9\overline{)99}$	$5\overline{)50}$

Divide, using the counters:

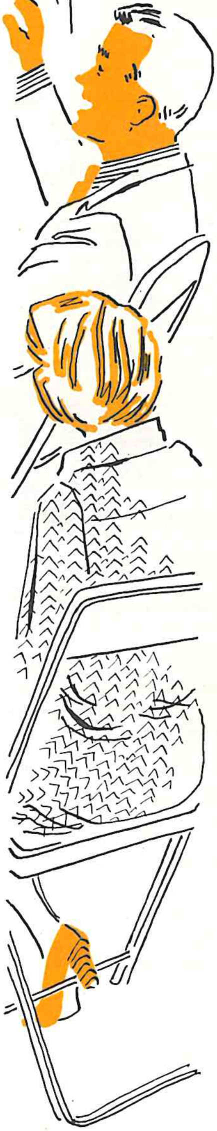
5. 5)  = ?

5 groups of 10 ones 5 ones

Divide, using all ones:

6. $2\overline{)60 \text{ ones} + 10 \text{ ones}} = ?$ **7.** $4\overline{)40 \text{ ones} + 16 \text{ ones}} = ?$

The First Night in Cub Scouts



Pete could hardly wait until he could become a member of the Cub Scouts. The evening he became a member, his father and mother went with him to the club house.

1. Thirty-six boys took the Cub Scout Oath together. There are 9 boys in a den. How many dens took their oath at the same time?

2. The boys were divided into three groups. They had to hop across the stage in one part of the "fun making." How many boys were in each group?

3. Another part of the fun was to have a "duck-walk." Half of the 36 boys had to walk like ducks. How many boys were in this act?

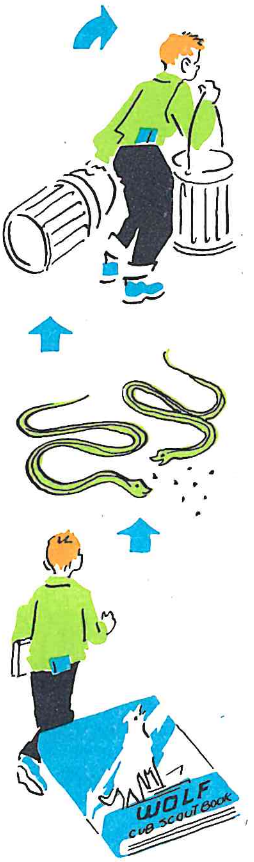
4. Pete's team won the relay race. The 9 boys on the team divided the 27 pieces of the prize candy equally. How many pieces did each boy receive?

5. Pete brought 27 cookies to the first den meeting. How many could each of the 9 boys in his den have?

6. Dan brought enough clay so that his den could make 18 ash trays. How many could each of the 9 boys make if the clay were divided equally among them?

7. The boys in the dens belonging to Pack 20 decided to put on a show together. There were sixty-three boys in the show. If there were 9 boys in each den, how many dens helped with the show?

Problems



Practice for Skill

Pete was proud of his new Cub Scout book. He carried it home from school in his hip pocket.

First, he fed his 2 pet snakes 14 flies. How many flies did each snake get?

Then he emptied the garbage pails. He emptied all four of them in 12 minutes. Find how long it took him to empty each one.

He thought to himself: "It is now 4:30. If I study my Cub Scout book 15 minutes, I can still see a 15-minute television program before 5 o'clock." Was he right?

Pete had this problem the next day in his arithmetic book: $6\overline{)42}$. "That is a hard one," he thought. "I don't know that fact." He used 42 counters and took 6 away at a time until he had used all 42 of them. Do this with your counters and see how many groups you have. Write the number of groups you have.

"This takes too long!" Pete said. "I'll never get finished. I must remember that seven 6's are 42. But I know that already! I learned it in multiplication. Multiplication facts will help me in division."

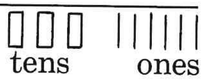
1. Do these:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
$5\overline{)40} = ?$	$7\overline{)35} = ?$	$8\overline{)40} = ?$	$7 \times 9 = ?$	$6 \times 8 = ?$	$4\overline{)24} = ?$

2. Pete saw these in the arithmetic book. He knows ÷ means division. Do them:

$24 \div 6 = ?$ $40 \div 8 = ?$ $81 \div 9 = ?$ $42 \div 6 = ?$ $63 \div 9 = ?$ $56 \div 7 = ?$

Practice in Division

$3\overline{)36}$ = $3\overline{)}$ 

= $\begin{array}{l} \quad\text{1 ten and 2 ones} \\ 3\overline{)\text{3 tens and 6 ones}} \\ \quad\underline{\text{3 tens}\qquad\qquad\quad} \\ \qquad\qquad\quad\text{6 ones} \\ \qquad\qquad\quad\underline{\text{6 ones}} \end{array}$ = $\begin{array}{r} 12 \\ 3\overline{)36} \\ \underline{3} \\ 6 \\ \underline{6} \end{array}$

1. $3\overline{)39} = 3\overline{)\text{3 tens and 9 ones}} = ?$ $\quad 3\overline{)66} = 3\overline{)\text{6 tens and 6 ones}} = ?$

2. $3\overline{)93} = 3\overline{)\text{9 tens and 3 ones}} = ?$ $\quad 3\overline{)69} = 3\overline{)\text{6 tens and 9 ones}} = ?$

3. $3\overline{)96} = 3\overline{)\text{9 tens and 6 ones}} = ?$ $\quad 3\overline{)99} = 3\overline{)\text{9 tens and 9 ones}} = ?$

4. How many 8's are there in 64? $8\overline{)64}$ $\begin{array}{r} 8 \\ \underline{\times ?} \\ 64 \end{array}$ How many 7's are there in 49? $7\overline{)49}$ $\begin{array}{r} 7 \\ \underline{\times ?} \\ 49 \end{array}$

5. How many 6's are there in 42? $6\overline{)42}$ $\begin{array}{r} 6 \\ \underline{\times ?} \\ 42 \end{array}$ How many 9's are there in 81? $9\overline{)81}$ $\begin{array}{r} 9 \\ \underline{\times ?} \\ 81 \end{array}$

6. How many 6's are there in 36? $6\overline{)36}$ $\begin{array}{r} 6 \\ \underline{\times ?} \\ 36 \end{array}$ How many 9's are there in 63? $9\overline{)63}$ $\begin{array}{r} 9 \\ \underline{\times ?} \\ 63 \end{array}$

7. How many 6's are there in 54? $6\overline{)54}$ $\begin{array}{r} 6 \\ \underline{\times ?} \\ 54 \end{array}$ How many 7's are there in 35? $7\overline{)35}$ $\begin{array}{r} 7 \\ \underline{\times ?} \\ 35 \end{array}$

8. How many 9's are there in 72? $9\overline{)72}$ $\begin{array}{r} 9 \\ \underline{\times ?} \\ 72 \end{array}$ How many 7's are there in 42? $7\overline{)42}$ $\begin{array}{r} 7 \\ \underline{\times ?} \\ 42 \end{array}$

9. How many 8's are there in 56? $8\overline{)56}$ $\begin{array}{r} 8 \\ \underline{\times ?} \\ 56 \end{array}$ How many 9's are there in 36? $9\overline{)36}$ $\begin{array}{r} 9 \\ \underline{\times ?} \\ 36 \end{array}$

Check Your Thinking

The following give facts which you should know. If you don't know them, fill the blanks to give you parts which you can use:

1. $8\overline{)40}$ $\quad \frac{40}{32 + 8} \quad$ $\overset{5}{8\overline{)40}}$ $\quad ? \times 8 = 40$

2. $6\overline{)42}$ $\quad \frac{42}{? + 6}$ or $\frac{42}{? + ?} \quad$ $\overset{?}{6\overline{)42}}$ $\quad ? \times 6 = 42$

3. $8\overline{)48}$ $\quad \frac{48}{24 + ?}$ or $\frac{48}{? + ?} \quad$ $\overset{?}{8\overline{)48}}$ $\quad ? \times 8 = 48$

4. $6\overline{)54}$ $\quad \frac{54}{? + 48}$ or $\frac{54}{? + ?} \quad$ $\overset{?}{6\overline{)54}}$ $\quad ? \times 6 = 54$

5. $8\overline{)56}$ $\quad \frac{56}{48 + ?}$ or $\frac{56}{? + ?} \quad$ $\overset{?}{8\overline{)56}}$ $\quad ? \times 8 = 56$

6. $7\overline{)42}$ $\quad \frac{42}{21 + ?}$ or $\frac{42}{? + ?} \quad$ $\overset{?}{7\overline{)42}}$ $\quad ? \times 7 = 42$

7. $9\overline{)54}$ $\quad \frac{54}{45 + ?}$ or $\frac{54}{? + ?} \quad$ $\overset{?}{9\overline{)54}}$ $\quad ? \times 9 = 54$

8. $5\overline{)40}$ $\quad \frac{40}{20 + ?}$ or $\frac{40}{? + ?} \quad$ $\overset{?}{5\overline{)40}}$ $\quad ? \times 5 = 40$

9. $7\overline{)63}$ $\quad \frac{63}{? + 7}$ or $\frac{63}{? + ?} \quad$ $\overset{?}{7\overline{)63}}$ $\quad ? \times 7 = 63$

10. $8\overline{)72}$ $\quad \frac{72}{? + ?} \quad$ How many 8's in 72? $\quad ? \times 8 = 72$

More Practice for Skill

1. Don's mother made hot gingerbread for 6 Cub Scouts. She cut it into 24 pieces. She told Don to divide it among the boys. Don cannot remember what he should get when he divides 24 into 6 equal parts. Do you?

2. Let's see if you remember some division facts:

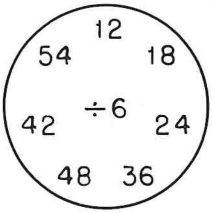
a. How many 6's in 24?
b. How many 7's in 35?
c. How many 2's in 14?
d. How many 4's in 28?
e. How many 5's in 25?
f. How many 9's in 36?
g. How many 10's in 40?
h. How many 7's in 42?

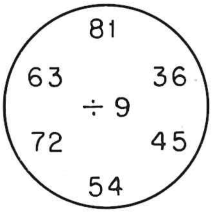
3. Divide, using your counters to figure any of these that you do not know:

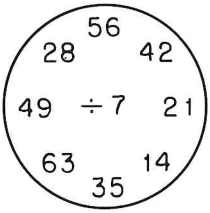
a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
$5\overline{)25}$	$8\overline{)32}$	$4\overline{)20}$	$8\overline{)16}$	$5\overline{)25}$	$9\overline{)36}$	$7\overline{)21}$	$7\overline{)35}$
$9\overline{)27}$	$4\overline{)28}$	$8\overline{)40}$	$6\overline{)18}$	$9\overline{)45}$	$8\overline{)24}$	$6\overline{)30}$	$7\overline{)49}$
$5\overline{)30}$	$9\overline{)36}$	$4\overline{)16}$	$6\overline{)42}$	$9\overline{)54}$	$5\overline{)35}$	$8\overline{)56}$	$4\overline{)12}$
$8\overline{)48}$	$5\overline{)50}$	$7\overline{)42}$	$4\overline{)24}$	$6\overline{)54}$	$9\overline{)72}$	$6\overline{)24}$	$9\overline{)81}$
$7\overline{)28}$	$6\overline{)36}$	$8\overline{)64}$	$3\overline{)15}$	$2\overline{)8}$	$7\overline{)14}$	$3\overline{)21}$	$2\overline{)6}$

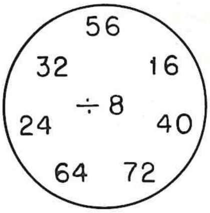
Whenever you see this, ÷,
you know that it means to divide.

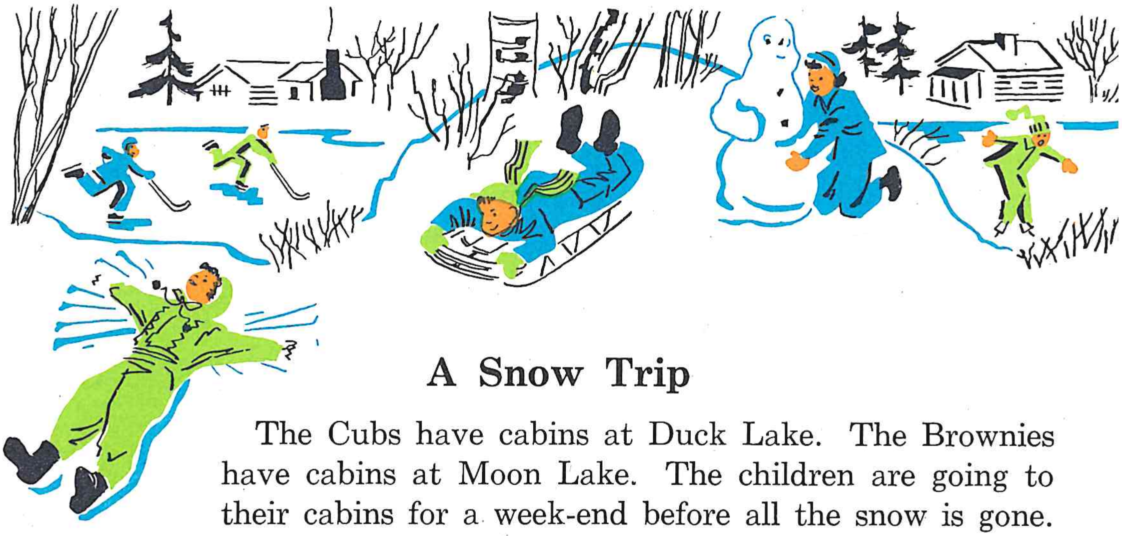
4. See if you can go around these circles by dividing each number by the one in the center. Say the answers to yourself:











A Snow Trip

The Cubs have cabins at Duck Lake. The Brownies have cabins at Moon Lake. The children are going to their cabins for a week-end before all the snow is gone.

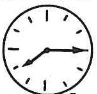
1. Joan's Brownie troop is going up Friday night. How many cars will be needed if 15 girls are going and 5 girls will ride in each car?

2. Pete's Cub den will leave for Duck Lake Saturday morning. He is taking a box of 12 peppermint sticks for the boys to eat when they get hungry in the afternoon. Are there enough so that each of the 9 boys can have more than one? How many can each boy have?

3. Ruth told a ghost story after they were all in bed. Joan was so afraid that she pulled the covers over her head when she heard 5 taps on the window. She heard 6 more taps, then 4, then 3, and then no more. How many taps were there altogether?

Betty heard the taps, too. She shouted for Miss Lane. Miss Lane went to the window. She saw a branch tap against the window as the wind made it swing. "Now go to sleep, girls," she said. "It is a quarter-past your bedtime."

What does a quarter-past mean on this clock?



4. The next day 7 of the girls made 28 snow angels. How many did each girl make if everyone made the same number?

5. The 9 boys in the Cub den took 18 blankets. How many blankets did each Cub take if everyone had to have the same number?

6. Joe was to bring enough bread for the boys. To know how much to bring, he decided to figure the number of slices they would use in 1 day. He thought that each boy might eat 2 slices at every meal. If he were right:

a. How many slices would 1 boy eat in 1 day?

b. How many slices would 9 boys eat in 1 day?

c. Would this be as much as 4 loaves with 12 slices in each loaf?

d. If the wheat bread they all liked had 9 slices in each loaf, how many loaves should he get for 2 days?

7. The toboggan made 36 trips down the hill. Jerry went down every third trip. How many rides did he get?

8. The Cubs and their den leader divided into 2 teams for a snowball fight. After each team made its fort, they made snowballs for ammunition. Carl's team made 55 snowballs. Find how many snowballs each boy on Carl's team could throw if they each threw an equal number.

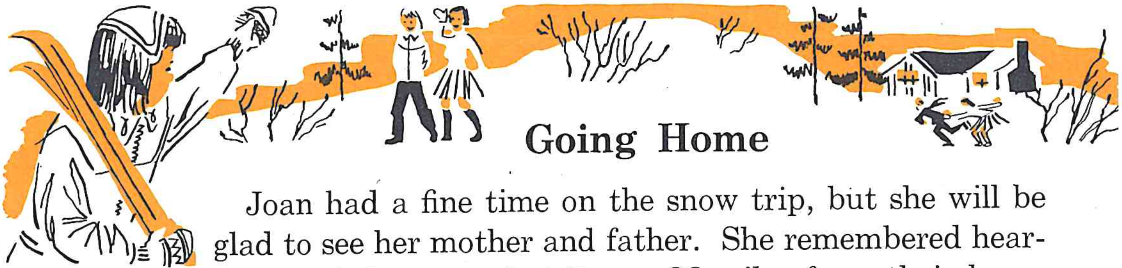
9. Each boy was to have 2 eggs to eat for breakfast. How many more or less than a dozen would the boys need for this meal?

10. The boys had to carry wood for their cabin. They carried 63 pieces. How many pieces did each of the 9 boys carry if everyone carried the same number?

11. The beans were so good, and the boys were so hungry, that they each ate 3 helpings. How many helpings did all the boys eat?

12. The boys had three cookies apiece before they went to bed. Find how many more or less than 2 dozen cookies the boys ate.

Problems Using Division Facts and Multiplication



Going Home

$\boxed{2\overline{)36}}$

Joan had a fine time on the snow trip, but she will be glad to see her mother and father. She remembered hearing her father say that it was 36 miles from their home to Moon Lake and back again. She wants to figure how many miles it is from Moon Lake to her home.

This is what she would have to do:

$$2\overline{)36} \quad = \quad 2\overline{)\text{3 tens and 6 ones}} \quad = \quad \overset{\text{1 ten and 8 ones} = 18}{2\overline{)\text{2 tens and 16 ones}}}$$

Now think tens and ones as you do this problem:

$$\begin{array}{r} 1 \\ 2\overline{)36} \\ \underline{2} \\ 1 \end{array}$$

Will there be a figure in tens place in the answer? Why? 36 = 3 tens and 6 ones. 3 tens cannot be divided into 2 equal parts and get all tens. But you can use 2 tens and have 1 ten left over. Write 2 under the 3 tens. When you divide 2 tens into 2 equal parts, you get 1 ten in each part. Write 1 over the 3 in tens place in the answer. Also write 1 under the line in tens place to show that it has not been used.

$$\begin{array}{r} 1 \\ 2\overline{)36} \\ \underline{2} \\ 16 \end{array}$$

You have 1 ten from the tens and 6 ones yet to be divided. The 1 ten and 6 ones make 16 ones.

If you divide the 16 ones into 2 equal parts, how many ones will you get in each part?

$$\begin{array}{r} 18 \\ 2\overline{)36} \\ \underline{2} \\ 16 \\ \underline{16} \end{array}$$

Write 8 in ones place in the answer. Why? Write 16 below the 16 ones to show that you have used them. There are 18 in each of the two equal parts of 36.

It is 18 miles from the lake to Joan's home.

1. Divide and check your answers: $2\overline{)32}$ $\quad 2\overline{)38}$ $\quad 2\overline{)34}$ $\quad 2\overline{)30}$

Division — Thinking Tens and Ones — Regrouping

Practice in Division

1. After Den meeting, the boys play in Tim's big back yard. The game they like best is "Capture the Flag." Some of the other boys in the neighborhood come to play with them. Tonight there were 12 boys. The boys counted off into two equal teams. How many boys were on each team?

2. Tim's mother brought out 2 trays of cookies. There were 2 dozen cookies on each tray. If the 6 boys on one team were given 2 dozen cookies, how many cookies did each boy have?

3. After they ate, the boys played a dart game. Don threw a dart 32 times and hit the target half of his number of tries. Find how many times Don hit the target.

4. Richard hit the target 48 times. Joe hit the target $\frac{1}{3}$ as many. How many times did he hit it? $3\overline{)48} = \quad ?$

5. Divide 84 into 6 equal parts:

$$\begin{array}{r} 14 \\ 6\overline{)84} \\ \underline{6} \\ 24 \\ \underline{24} \end{array}$$

Will the answer be as much as 10? as much as 20?

You cannot divide 8 tens into 6 equal parts and get a whole number of tens in each part.

Six of the 8 tens can be divided. Why are there 2 tens left over, and why is there 1 ten in the answer? Why is 24 written under the line? Must 24 be used as tens and ones, or as ones? Why? What does the answer mean?

Divide, finding the size of one of the equal parts:

	a.	b.	c.	d.	e.	f.	g.
6.	$7\overline{)84}$	$4\overline{)68}$	$2\overline{)72}$	$7\overline{)91}$	$5\overline{)65}$	$4\overline{)52}$	$5\overline{)95}$
7.	$6\overline{)72}$	$5\overline{)90}$	$4\overline{)56}$	$5\overline{)85}$	$6\overline{)78}$	$5\overline{)70}$	$4\overline{)60}$
8.	$4\overline{)72}$	$5\overline{)75}$	$4\overline{)96}$	$6\overline{)90}$	$4\overline{)44}$	$6\overline{)66}$	$2\overline{)32}$

Finding How Many Groups

You have learned about dividing a whole into so many equal parts. For example, if you divide 36 apples into 3 equal parts, how many apples will there be in each part? $3\overline{)36\text{ apples}} = 12$ apples. Why?

Here is a different kind of division problem.

Carl's Cub den is selling tickets to a magic show for 3¢ each. They are going to use the money for another snow trip.

Carl has 39¢ so far. How many tickets did he sell?

Do you see how the two problems are different?

$$3\overline{)36\text{ apples}} \qquad 3¢\overline{)39¢}$$

Carl wanted to know how many groups of 3¢ each there are in 39¢. Why?

If we write $3¢\overline{)39¢} = 3\text{ ones}\overline{)3\text{ tens} + 9\text{ ones}}$, can you use the parts of tens and ones easily? Would it be easier to use the part 30 ones, or $3\text{ ones}\overline{)30\text{ ones} + 9\text{ ones}}$?

$$\begin{array}{r} 3¢\overline{)39¢} \\ \\ 10 \\ 3\overline{)39} \\ \underline{30} \end{array}$$

How many groups of 3¢ each are there in 30¢? You see the answer as 10 (ten 3's = 30). You write the 30 under 39 to show how many you have used. You write 10 in the answer.

$$\begin{array}{r} \left.\begin{array}{r} 3 \\ 10 \end{array}\right\rangle 13 \\ 3\overline{)39} \\ \underline{30} \\ 9 \\ \underline{9} \end{array}$$

You still have 9 ones which have not been divided. How many groups of 3 are there in 9? Why do you write the 9 under the 9 that came from 39? Why do you write the 3 in the answer over the 9 in 39?

Carl had sold 13 tickets.

Divide (think of the parts as groups of ones):

$5¢\overline{)55¢}$ $3¢\overline{)96¢}$ $4¢\overline{)48¢}$ $3¢\overline{)63¢}$ $2¢\overline{)24¢}$ $3¢\overline{)69¢}$ $8¢\overline{)88¢}$

Practice in Dividing

1. Danny brought a piece of plastic cord to Cub meeting. He needs 3-inch pieces for a key chain. How many 3-inch pieces can he cut from a piece 42 inches long? Explain the figuring shown here. How did we get 14?

$$\begin{array}{r} 14\ \text{pieces} \\ 3\ \text{inches}\overline{)42\ \text{inches}} \\ \underline{30} \\ 12 \\ \underline{12} \end{array}$$

2. Divide, thinking the number to be divided as ones, and the number you are dividing by as a group of ones:

a.	b.	c.	d.	e.	f.
$2\overline{)52}$	$3\overline{)48}$	$3\overline{)75}$	$3\overline{)42}$	$2\overline{)32}$	$2\overline{)58}$

3. Molly is making a pretty powder puff for her mother. All the girls in her Bluebird group are bringing pieces of ribbon and lace for this. Molly brought a piece of lace 38 inches long. If she cuts this into halves, how long will each piece be?

4. Janet brought satin ribbon for rosebuds. It takes 2 inches to make a large rosebud. How many 2-inch pieces can be cut from a piece of ribbon 32 inches long?

5. The girls need pieces of blue ribbon 3 inches long. How many pieces can be cut from one piece that is 60 inches long?

6. Divide (think first — about how much will I get?):

$3\overline{)81}$ $2\overline{)56}$ $2\overline{)30}$ $2\overline{)68}$ $3\overline{)51}$ $2\overline{)58}$

$3\overline{)57}$ $5\overline{)85}$ $4\overline{)96}$ $3\overline{)87}$ $3\overline{)66}$ $4\overline{)60}$

7. Write a story problem for the class to solve that will use division of the kind,

$\text{small group}\overline{)\text{large group}} = \ ?\ \text{groups.}$

Carl Sells More Tickets

Carl sold more tickets after school. He now has 78¢. How many 3¢ tickets did he sell? $3\text{¢}\overline{)78\text{¢}}$

$3\text{¢}\overline{)78\text{¢}} \quad = \quad 3 \text{ ones}\overline{)7 \text{ tens} + 8 \text{ ones}} \quad = \quad 3 \text{ ones}\overline{)70 \text{ ones} + 8 \text{ ones}}$

70 ones ÷ 3 does not come out evenly. So finding other parts we have:

$3\overline{)78} \quad = \quad 3 \text{ ones}\overline{)6 \text{ tens} + 18 \text{ ones}} \quad = \quad 3 \text{ ones}\overline{)60 \text{ ones} + 18 \text{ ones}}$

Can you find the number of groups of 3 ones in 60 ones? There are 10 groups in 30; how many would there be in two 30's, or 60?

$$\begin{array}{r@{}l} & 20 \qquad + 6 \\ 3 \text{ ones}) & \overline{60 \text{ ones} + 18 \text{ ones}} \\ & \underline{60 \text{ ones} \qquad\qquad} \\ & \qquad\quad 18 \text{ ones} \\ & \qquad\quad \underline{18 \text{ ones}} \end{array} \quad \text{or} \quad \begin{array}{r} \left.\begin{array}{r} 6 \\ 20 \end{array}\right\rangle 26 \\ 3\overline{)78} \\ \underline{60} \\ 18 \\ \underline{18} \end{array}$$

Why do we write 60 under 78, and 20 in the answer?

Where do we get the 18 under the line?

How many groups of 3 ones are there in 18 ones?

Carl has now sold 26 tickets.

1. Divide: $\begin{array}{r} 20 \\ 3\text{¢}\overline{)84\text{¢}} \end{array}$ Can 8 tens or 80 ones be divided into groups of 3 ones evenly?

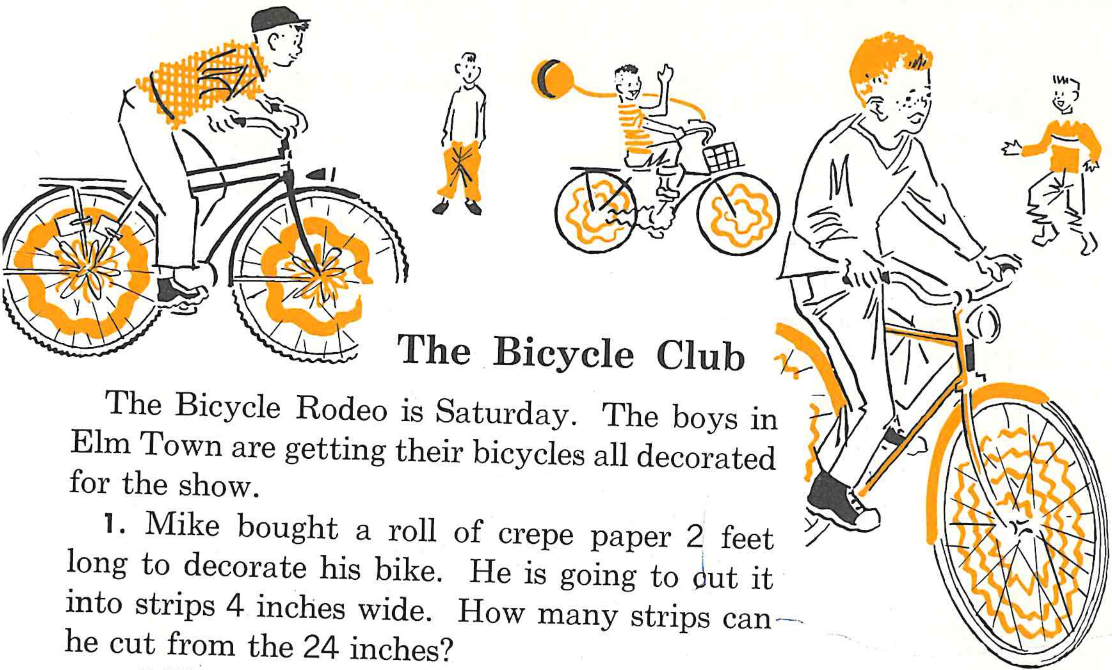
We use 6 tens instead of 8 tens. Why? (84 = 60 + 24) Finish the work.

2. Divide: $4\text{¢}\overline{)96\text{¢}}$ = ?.

$4\text{¢}\overline{)96\text{¢}} \quad = \quad 4\text{¢}\overline{)9 \text{ dimes} + 6 \text{ cents}} \quad = \quad 4\text{¢}\overline{)8 \text{ dimes} + 16 \text{ cents}} \quad = \quad ?$

3. Divide, thinking how many groups of a given size in groups of ones:

$3\overline{)84} \qquad 2\overline{)36} \qquad 2\overline{)56} \qquad 3\overline{)75} \qquad 2\overline{)54} \qquad 3\overline{)72}$



The Bicycle Club

The Bicycle Rodeo is Saturday. The boys in Elm Town are getting their bicycles all decorated for the show.

1. Mike bought a roll of crepe paper 2 feet long to decorate his bike. He is going to cut it into strips 4 inches wide. How many strips can he cut from the 24 inches?

2. Mike needs some clothespins to put on his bike. His mother said he could have $\frac{1}{2}$ of the dozen she had bought at the store. Find how many he can have.

3. Another strip of paper that Mike bought was 80 inches long. He cut it into 8-inch pieces to go around the hub of the bike wheel. How many pieces will he have left if he uses 4 of them?

4. Divide 84 into 7 equal parts. What is the size of one part?

$7\overline{)84} \quad = \quad 7\overline{)8 \text{ tens and } 4 \text{ ones}} \quad = \quad 7\overline{)7 \text{ tens and } 14 \text{ ones}} \quad = \quad ?$

5. Divide (find the size of one of the equal parts):

a.	b.	c.	d.	e.	f.	g.	h.
$9\overline{)99}$	$9\overline{)45}$	$7\overline{)91}$	$8\overline{)72}$	$8\overline{)96}$	$9\overline{)63}$	$4\overline{)92}$	$5\overline{)60}$

6. Divide (find how many groups of the given size in the whole):

$3\overline{)54} \quad 3\overline{)45} \quad 4\overline{)36} \quad 4\overline{)72} \quad 3\overline{)36} \quad 7\overline{)77} \quad 4\overline{)56} \quad 4\overline{)60}$

Practice in Division

The Short Way to Find "How Many Groups"

Six of the boys have been working very hard selling tickets. Carl decides to treat each one to a 6¢ candy bar. He has 73¢. He wants to be sure he has enough money before he asks the boys to come into the store for their treat. See whether or not he has enough money.

His problem is, "How many groups of 6¢ are there in 73¢?" We have to think $6¢\overline{)73¢} = \ ?$. The way you did this before to see its meaning was, $6¢\overline{)60¢ + 13¢}$. Why? You could do it as you see in the box. Explain:

$$\begin{array}{r} \left.\begin{array}{r} 2 \\ 10 \end{array}\right\rangle 12 \\ 6\overline{)73} \\ 60 \\ \hline 13 \\ 12 \\ \hline 1 \end{array}$$

Now see if you can't do it a shorter way. $6\overline{)73} = \ ?$ How many 6's in 7 tens? This does not divide evenly, so you will think, how many 6's in 6 tens? (It is really, how many 6's in 60.)

$$6\overline{)73}$$

You can use 6 tens out of the 7 tens. 6 tens ÷ 6 ones = 10, or 1 ten.

$$\begin{array}{r} 1 \\ 6\overline{)73} \\ 6 \\ \hline 13 \end{array}$$

Write 6 under the 7 to show that you have used 60 ones or 6 tens out of the 7 tens. That leaves 1 ten and 3 ones, or 13 ones still to be divided.

$$\begin{array}{r} 12 \\ 6\overline{)73} \\ 6 \\ \hline 13 \\ 12 \\ \hline 1 \text{ R} \end{array}$$

How many 6's in 13? You write 2 in ones place in the answer. Why?

Write 12 under the 13 to show that you have used 12 of them. You have 1 left over. This is called a **remainder.** Write R by it to show that it is a remainder.

The answer in the division is 12 R 1, so Carl has enough money to treat 12 boys.

Do these, writing R by any number left over:

	a.	b.	c.	d.	e.	f.	g.
1.	$6\overline{)77}$	$5\overline{)89}$	$4\overline{)53}$	$5\overline{)64}$	$8\overline{)92}$	$5\overline{)73}$	$7\overline{)87}$

Making Sure That You Understand

Pete sells boxes of soap to all his neighbors so he can go to Y camp. He goes out every evening with boxes of soap which he carries in a basket. He puts 8 boxes in a basket so he can carry them easily. Pete wants to know how many times he can fill his basket if he has 90 boxes.

First, we will think, about how many groups of 8 are there in 90 ones or 9 tens? Will there be as many as 10? more than 10? Why?

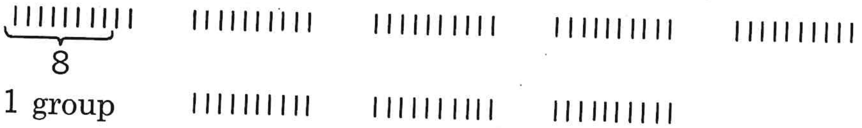
$8\overline{)90}$

$$8\overline{)90} \;=\; 8\text{ ones}\overline{)\;\underset{\text{tens}}{\square\,\square\,\square\,\square\,\square\,\square\,\square\,\square\,\square}\qquad\underset{\text{ones}}{}}$$

$$=\; 8\text{ ones}\overline{)9\text{ tens and }0\text{ ones}}$$

How many groups of 8 do you get in 1 ten and how many are left over? Is your answer 1 group with 2 ones left over?

See how many groups of 8 there are in 8 tens:



Do you find ten groups of 8 in 8 tens ($10 \times 8 = 80$)?

$$\begin{array}{r} 11 \\ 8\overline{)90} \\ \underline{8} \\ 10 \\ \underline{8} \\ 2\text{ R} \end{array}$$

We can use 8 tens because we see that it will give us 10 groups of 8. Instead of writing 10, we put 1 in tens place in the answer.

We have 1 ten and 0 ones or 10 ones which are still to be divided. There is 1 group of 8 in 10. How many are there in the remainder?

Pete can fill his basket 11 times and have R 2.

1. Divide, explaining each step (using short way):

How many groups of 6 things in 66 things? in 78 things? in 90 things?

Practice in Division

Say these division facts to yourself. You should know every one of them:

	a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
1.	$8\overline{)\overset{7}{56}}$	$4\overline{)\overset{3}{12}}$	$7\overline{)\overset{7}{49}}$	$9\overline{)\overset{9}{81}}$	$7\overline{)\overset{8}{56}}$	$4\overline{)\overset{6}{24}}$	$5\overline{)\overset{7}{35}}$	$8\overline{)\overset{8}{64}}$
2.	$9\overline{)\overset{4}{36}}$	$7\overline{)\overset{6}{42}}$	$6\overline{)\overset{6}{36}}$	$9\overline{)\overset{7}{63}}$	$8\overline{)\overset{4}{32}}$	$5\overline{)\overset{9}{45}}$	$9\overline{)\overset{5}{45}}$	$8\overline{)\overset{5}{40}}$
3.	$9\overline{)\overset{8}{72}}$	$8\overline{)\overset{6}{48}}$	$4\overline{)\overset{4}{16}}$	$7\overline{)\overset{9}{63}}$	$6\overline{)\overset{3}{18}}$	$6\overline{)\overset{9}{54}}$	$8\overline{)\overset{9}{72}}$	$9\overline{)\overset{6}{54}}$

Divide, writing the tens and ones:

4. $4\overline{)72}$ $2\overline{)74}$ $4\overline{)64}$ $3\overline{)57}$ $3\overline{)39}$ $4\overline{)88}$ $3\overline{)99}$ $2\overline{)46}$

Divide, thinking, "What is the size of one part?":

5. $4\overline{)84}$ $4\overline{)48}$ $6\overline{)66}$ $9\overline{)99}$ $5\overline{)65}$ $8\overline{)96}$ $3\overline{)72}$ $5\overline{)85}$

6. $7\overline{)91}$ $3\overline{)63}$ $7\overline{)98}$ $2\overline{)82}$ $4\overline{)88}$ $5\overline{)55}$ $3\overline{)87}$ $6\overline{)72}$

7. $6\overline{)78}$ $4\overline{)72}$ $7\overline{)70}$ $3\overline{)84}$ $3\overline{)69}$ $2\overline{)34}$ $7\overline{)77}$ $4\overline{)92}$

Divide (be sure to label any remainders):

8. $2\overline{)93}$ $3\overline{)77}$ $5\overline{)73}$ $5\overline{)49}$ $5\overline{)53}$ $5\overline{)10}$ $4\overline{)24}$ $6\overline{)88}$

9. $5\overline{)46}$ $5\overline{)14}$ $4\overline{)12}$ $3\overline{)41}$ $5\overline{)22}$ $3\overline{)58}$ $7\overline{)78}$ $4\overline{)51}$

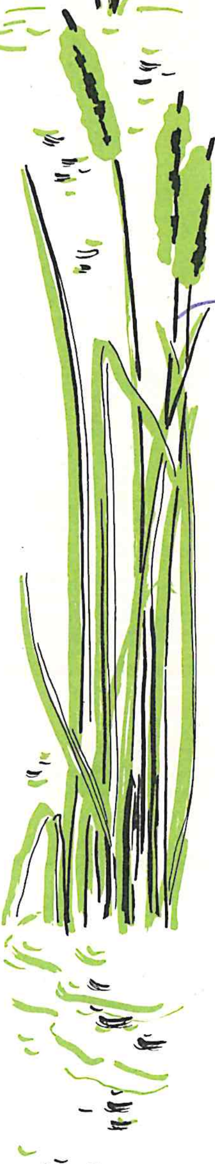
Divide, thinking, "How many groups of a given size?":

	a.	**b.**
10.	$3\overline{)45} = 3\overline{)30 + 15} = \ ?$	$4\overline{)76} = 4\overline{)40 + ?} = \ ?$
11.	$5\overline{)65} = 5\overline{)50 + ?} = \ ?$	$6\overline{)96} = 6 \text{ ones}\overline{)6 \text{ tens} + ?} = \ ?$

12. How many 6¢ air mail stamps can you buy for 72¢? ($6¢\overline{)72¢} = \ ?$)

13. How many weeks are there in 91 days?

Smoke Signals



Dick and Jeff belong to the Indian Club. Any boy can belong to it if he is at least 7 "winters" old. Word has been sent by an Indian runner that there will be a powwow Saturday at Twin Hills.

1. Saturday morning all 34 boys are at Twin Hills for the powwow. They divide themselves into 2 tribes for an Indian battle. How many boys are in each tribe?

2. Dick (Sitting Bull) is the chief of the Yellow Tail tribe. His warriors crawl along Snake Creek to where the other tribe has its horses. They get away with 36 horses (sticks). How many horses are left over if each warrior in the Yellow Tail tribe is given 2?

3. Jeff (Spotted Mule) is the chief of the Red Eagles. He made war on Sitting Bull's tribe for stealing the horses. His warriors went out in groups to surround the enemy. How many groups of 5 did he make?

4. One warrior saw the enemy in Ten Sheep Valley. They sent up a smoke signal. They sent up 3 puffs of smoke at a time, and then they would wait a few minutes. Twenty-one puffs went up in all. How many times did they signal?

5. Spotted Mule saw many tracks at Snake Creek. He counted the tracks of 38 different horses. These tracks divided evenly a mile down the creek and went in two directions. Help Spotted Mule find how many horses went in each direction.

Problems

Checking Division

1. What is the size of one part when 92 is divided into 4 equal parts?

First think, "about how much." This is a rough check. Why?

One way to check division exactly is to add the amount in each part as many times as you have parts.

$$\begin{array}{r} 23 \\ 4\overline{)92} \\ \underline{8} \\ 12 \\ \underline{12} \end{array} \qquad \begin{array}{r} \text{Check by adding:} \\ 23 \\ 23 \\ 23 \\ +\,23 \\ \hline 92 \end{array}$$

A second way to check division is to take the size of one part and multiply it by the number of parts.

$$\begin{array}{r} 23 \\ 4\overline{)92} \\ \underline{8} \\ 12 \\ \underline{12} \end{array} \qquad \begin{array}{r} \text{Check by multiplying:} \\ 23 \\ \times\,4 \\ \hline 92 \end{array}$$

Another way to check is to subtract the part as many times as you have a number of parts.

$$\begin{array}{r} 23 \\ 4\overline{)92} \\ \underline{8} \\ 12 \\ \underline{12} \end{array} \qquad \begin{array}{l} \text{Check by subtracting:} \\ 92 \\ \underline{-\,23}\text{—}1 \\ 69 \\ \underline{-\,23}\text{—}2 \\ 46 \\ \text{and so on.} \end{array}$$

2. Divide, and check by three different ways:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**
$5\overline{)60}$	$3\overline{)87}$	$6\overline{)48}$	$7\overline{)84}$	$2\overline{)64}$	$5\overline{)75}$	$6\overline{)84}$

3. Tell why addition, subtraction, or multiplication can be used to check division.

Practice with Zeros in Division

1. Divide:

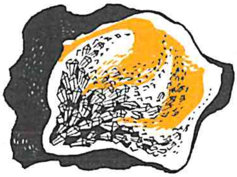
a.	b.	c.	d.	e.	f.	g.	h.
$9\overline{)90}$	$4\overline{)40}$	$3\overline{)30}$	$7\overline{)70}$	$2\overline{)20}$	$6\overline{)60}$	$4\overline{)80}$	$3\overline{)90}$
$2\overline{)80}$	$3\overline{)60}$	$8\overline{)80}$	$2\overline{)60}$	$2\overline{)40}$	$2\overline{)10}$	$4\overline{)20}$	$5\overline{)10}$

2. Divide (label any remainders):

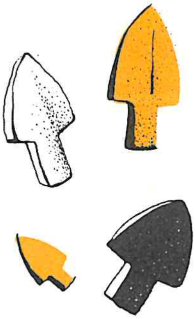
$4\overline{)50}$	$6\overline{)70}$	$2\overline{)70}$	$6\overline{)90}$	$4\overline{)70}$	$5\overline{)60}$	$8\overline{)90}$	$7\overline{)80}$
$7\overline{)90}$	$5\overline{)80}$	$4\overline{)90}$	$3\overline{)40}$	$2\overline{)90}$	$3\overline{)60}$	$8\overline{)70}$	$3\overline{)50}$

3. The boys and girls that belong to the Rock Club look for rocks along Eagle Creek. Grandpa Cone goes with them when he has time. Today 5 of the girls found 20 interesting rocks. How many rocks will each girl receive if they are divided evenly?

4. Three of the boys found 10 *geodes*. Can they be divided evenly among the 3 boys? How many would each boy receive? Will there be any rocks left over?



5. Kathy Baker is arranging Grandpa Cone's arrowheads on a piece of black felt so they can be seen easily. Kathy chose a white arrowhead for the middle. She wants to know if she can place the other 60 arrowheads on 8 lines with an equal number on each line. Help Kathy find out how many arrowheads she will have on each of the 8 lines. Draw a picture to show how you would arrange the arrowheads.



6. They are going to label each rock. The 3 children who print the best are going to make the 50 labels. If they plan to do an equal number, how many labels would each of the 3 children make? Would there be any left over? How many?

Practice for Skill in Division

1. Divide and check by multiplication:

$3\overline{)63}$ $\quad$ $2\overline{)68}$ $\quad$ $2\overline{)74}$ $\quad$ $6\overline{)84}$ $\quad$ $2\overline{)72}$ $\quad$ $4\overline{)96}$

2. Pete belongs to the Y.M.C.A. He is on the tumbling team. It takes 6 boys to make a cart wheel. There are 18 boys on the team. How many cart wheels could they make?

3. Pete swims at the Y. He can swim under water. If he has to come up 3 times for air while swimming 84 feet, about how far can he swim on one breath?

4. Pete is selling soap so he can go to Y camp. He has sold the same number of boxes each night. If he sold 48 boxes in 3 nights, how many boxes did he sell each night?

5. Pete made $.90 selling soap tonight. He gets to keep half of it for his camp expenses. How much money did he earn for camp tonight?

6. Divide and check:

$$\begin{array}{r} 13 \\ 6\overline{)79} \\ \underline{6} \\ 19 \\ \underline{18} \\ 1\ \mathrm{R} \end{array} \qquad\qquad \begin{array}{r} \text{Check} \\ 13 \\ \underline{\times 6} \\ 78 \\ \underline{+1}\ \mathrm{R} \\ 79 \end{array}$$

Do you see what we do with the R when checking a division exercise? Tell why it is added.

Do these exercises at the board as your teacher reads them to you:

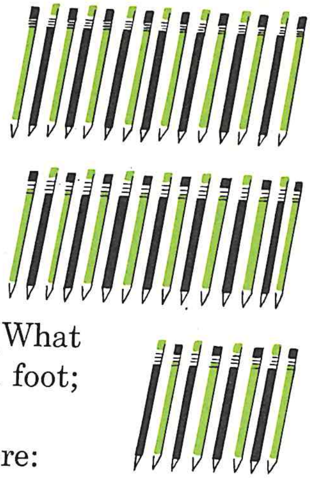
7. $4\overline{)56}$ $\quad$ $5\overline{)60}$ $\quad$ $3\overline{)48}$ $\quad$ $4\overline{)26}$ $\quad$ $5\overline{)75}$ $\quad$ $7\overline{)91}$

Divide and check (try for speed and accuracy):

8. $3\overline{)87}$ $\quad$ $3\overline{)79}$ $\quad$ $4\overline{)56}$ $\quad$ $2\overline{)55}$ $\quad$ $4\overline{)68}$ $\quad$ $4\overline{)90}$

9. In 78 ÷ 3, use $\begin{array}{l} \quad ?\ \ +\ \ ? = ? \\ 3\overline{)60 + 18} \end{array}$

Problems and Exercises



1. Use counting to find how many groups of 6 pencils each there are in this picture. What is the remainder? Do the problem on paper.

2. How many groups of 6 inches are there in 87 inches? How many inches are left over?

3. Are there as many as 5 feet in 58 inches? (What ways may you use to find the answer? 12 inches = 1 foot; $5\overline{)58}$ or $5 \times 12 =$?.)

4. 4 feet and 4 inches = ? inches. Which is more: 4 feet and 4 inches, or 51 inches?

5. Harry is selling 8 stamps at a time from his stamp collection. If he has 67 stamps, how many groups can he sell, and how many will he have left over?

6. What does the word "remainder" mean?

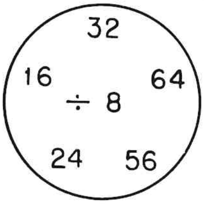
7. Bill has 49 rocks. He wants to give each of his 8 friends an equal number of them. How many rocks will each friend get? Will he have any rocks left over?

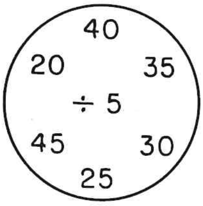
8. Divide and check your answer three ways: $6\overline{)56}$.

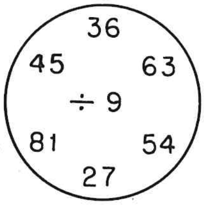
Divide:

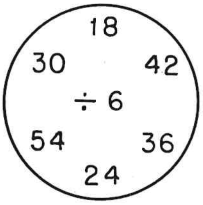
	a.	**b.**	**c.**	**d.**	**e.**	**f.**
9.	$9\overline{)85}$	$4\overline{)60}$	$2\overline{)86}$	$3\overline{)77}$	$8\overline{)74}$	$5\overline{)90}$
10.	$4\overline{)92}$	$2\overline{)56}$	$2\overline{)90}$	$7\overline{)34}$	$4\overline{)66}$	$7\overline{)84}$

11. See how fast you can go around the wheels by saying the answers:









Reasoning without Numbers

1. How would you work a problem like this?

You know the number of pieces of candy a boy has and also the number of friends with whom he is going to share. Find out how many pieces each boy will get.

2. In how many ways may a division problem be checked? What are they?

3. What is the meaning of the word "divide"?

4. What happens if a number is divided by itself (such as 3 divided by 3)?

5. If you are building bookshelves, how would you figure how far apart the shelves should be?

6. Why are books placed straight up and down on bookshelves? How would you place them to get the greatest number on a shelf? (Try this with the school library books.)

7. What is the shortest way to check a division problem like this: $4\overline{)96}$?

8. What would you have to know to find the answer to this problem? Johnny walked up the steps to his room many times. One night he walked up five times. How many steps did he walk up altogether?

9. If you have a large group of things and you want to find how many smaller groups there are in it, would you divide or multiply?

10. Write a problem in words, ask the boys and girls in your room to solve it tomorrow in class.

11. Give answers to the following questions:

a. Why can't we change the places of the numbers in a division like we can in a multiplication?

b. What do you do with the remainder when you are checking your answer to a division problem?

Rocks from Arizona

Richard's aunt lives in Arizona. She told Richard in her last letter that she has 246 rocks that she gathered on the desert and he could have one-half of them when he comes to visit her.

Richard knows that finding one-half of anything is dividing it into 2 equal parts. How many rocks will he get?

$2\overline{)246} = 2\overline{)\;\square\,\square \quad \square\,\square\,\square\,\square \quad ||||||}$

hundreds tens ones

$= 2\overline{)2 \text{ hundreds} + 4 \text{ tens} + 6 \text{ ones}}$

Now think hundreds, tens, and ones.

$$\begin{array}{r} 123 \\ 2\overline{)246} \end{array}$$

The first figure in the answer will be in hundreds place. Why?

Can you explain the rest of the division?

Divide the 4 tens. 4 tens divided into 2 equal parts = 2 tens in each part. Write 2 over the 4 in tens place in the answer. Write 4 under the 4 to show that you used all 4 tens.

Divide the 6 ones. 6 ones divided into 2 equal parts gives 3 ones in each of the 2 equal parts. Write 3 in ones place in the answer. Write 6 under the 6 to show that you used all 6 ones.

The answer is 123.

1. Divide, writing out the hundreds, tens, and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
$4\overline{)488}$	$3\overline{)396}$	$2\overline{)224}$	$3\overline{)699}$	$2\overline{)824}$	$4\overline{)884}$

2. Divide, thinking the hundreds, tens, and ones:

$6\overline{)660}$ $4\overline{)484}$ $2\overline{)466}$ $5\overline{)550}$ $3\overline{)663}$ $2\overline{)226}$

Heap Big Powwow

There is going to be another big Indian powwow Saturday at Twin Hills. All the boys in Yellow Tail's tribe and all the Red Eagles are getting ready for it.

1. Tommy's big sister let him use her wooden beads. Tommy counted them and found there were 136 beads. He wants to make 4 chains to wear around his neck. He knows he must divide 136 beads into four equal parts.

$4\overline{)136}$

There will be no figure in hundreds place in the answer. You cannot divide 1 hundred into 4 parts and get a figure in hundreds. Change the 1 hundred to 10 tens. Then you have 13 tens, and the first figure in the answer will be in tens place.

$$4\overline{)136} = 4\overline{)\underset{\text{1 hundred}}{\square}\quad\underset{\text{3 tens}}{\square\,\square\,\square}\quad\underset{\text{6 ones}}{||||||}} = 4\overline{)\underset{\text{10 tens}}{\square\square\square\square\square\square\square\square\square\square}\quad\underset{\text{3 tens}}{\square\square\square}\quad\underset{\text{6 ones}}{||||||}}$$

$$\begin{array}{r} 3 \\ 4\overline{)136} \\ \underline{12} \\ 1 \end{array}$$

You can find four equal parts in 12 tens. Write 3 in tens place in the answer. Write 12 below the 13 to show you used 12 of the 13 tens. You have 1 ten left.

$$\begin{array}{r} 34 \\ 4\overline{)136} \\ \underline{12} \\ 16 \\ \underline{16} \end{array}$$

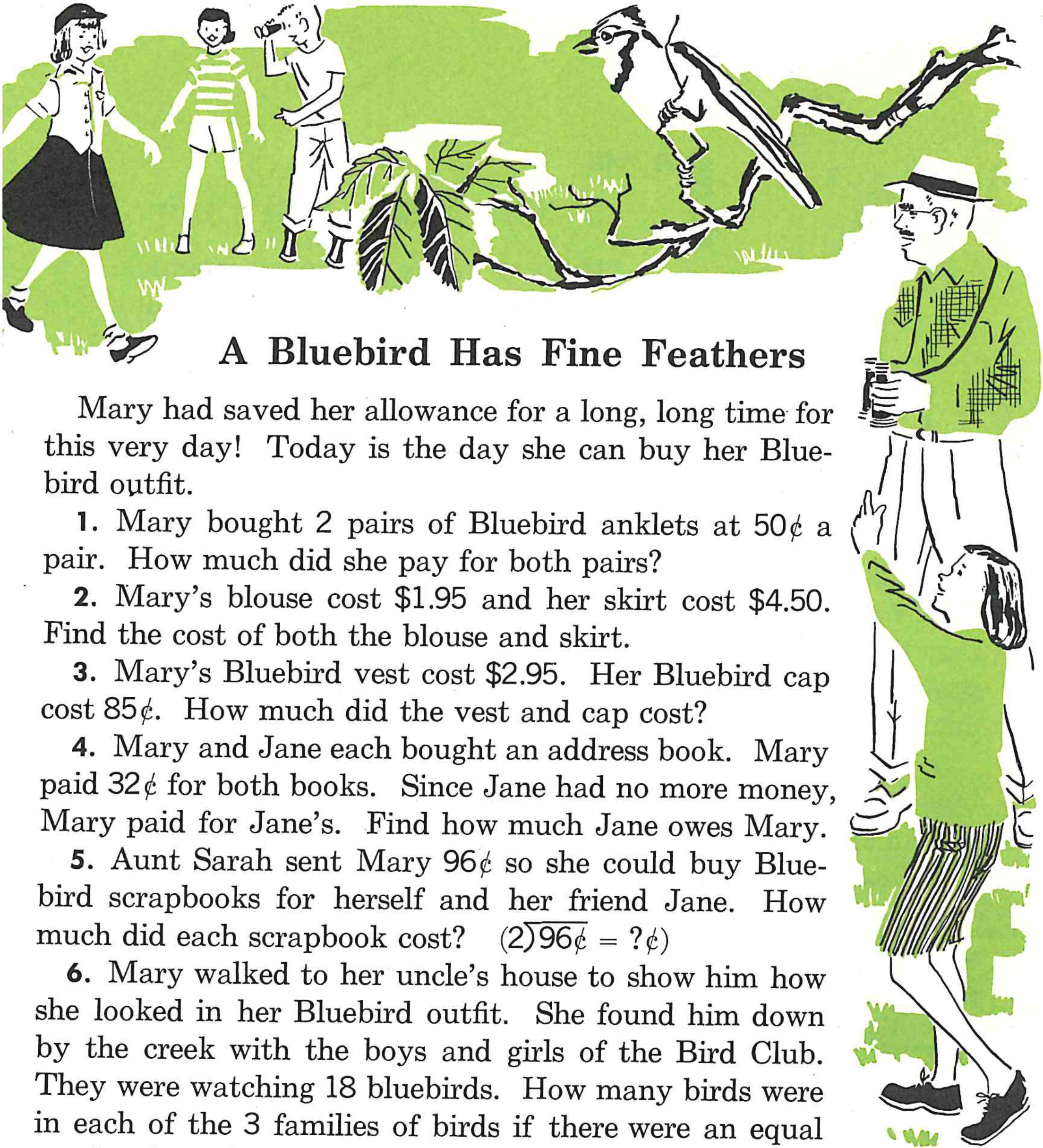
You have 1 ten and 6 ones to be divided. One ten and 6 ones = 16 ones. 16 ones divided into four equal parts gives 4 in each part. Write the 4 over the 6 in ones place. Write 16 below the 16 to show that you have used 16 of the 16 ones.

Tommy had 34 beads for each chain.

2. Tommy cut 9 long hairs from his horse's tail so he could weave 4 bracelets for each arm. He has 116 small stones which he is going to tie on the 8 bracelets. How many stones does he have for each bracelet?

3. Divide: $5\overline{)145}$ $6\overline{)138}$ $2\overline{)156}$ $7\overline{)168}$ $9\overline{)216}$ $4\overline{)136}$

Division — Changing Hundreds to Tens



A Bluebird Has Fine Feathers

Mary had saved her allowance for a long, long time for this very day! Today is the day she can buy her Bluebird outfit.

1. Mary bought 2 pairs of Bluebird anklets at 50¢ a pair. How much did she pay for both pairs?

2. Mary's blouse cost $1.95 and her skirt cost $4.50. Find the cost of both the blouse and skirt.

3. Mary's Bluebird vest cost $2.95. Her Bluebird cap cost 85¢. How much did the vest and cap cost?

4. Mary and Jane each bought an address book. Mary paid 32¢ for both books. Since Jane had no more money, Mary paid for Jane's. Find how much Jane owes Mary.

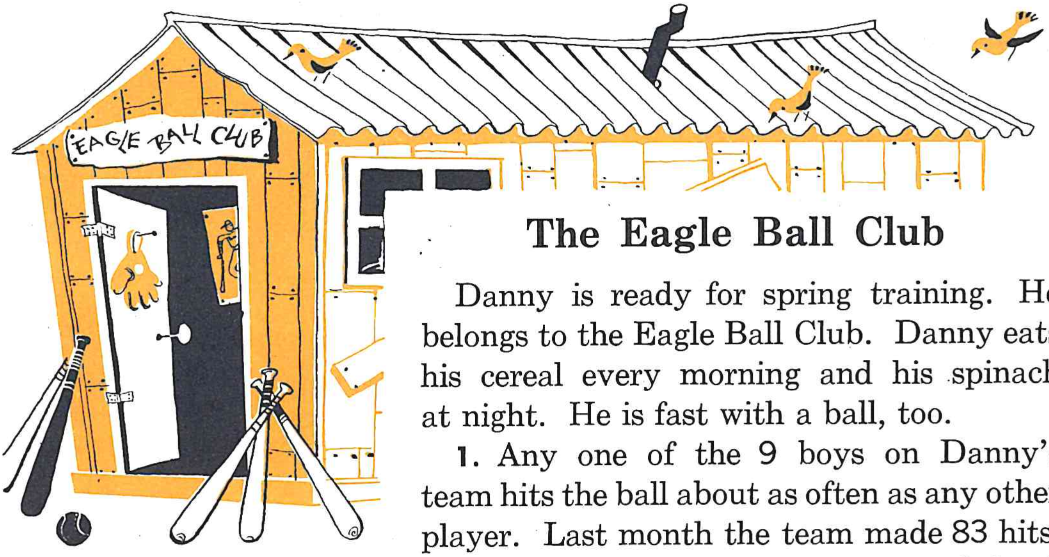
5. Aunt Sarah sent Mary 96¢ so she could buy Bluebird scrapbooks for herself and her friend Jane. How much did each scrapbook cost? ($2\overline{)96¢}$ = ?¢)

6. Mary walked to her uncle's house to show him how she looked in her Bluebird outfit. She found him down by the creek with the boys and girls of the Bird Club. They were watching 18 bluebirds. How many birds were in each of the 3 families of birds if there were an equal number in each family?

Divide:

	a.	**b.**	**c.**	**d.**	**e.**	**f.**
7.	$4\overline{)39}$	$5\overline{)63}$	$7\overline{)50}$	$8\overline{)77}$	$3\overline{)333}$	$5\overline{)585}$

Review — Addition, Multiplication, Division



The Eagle Ball Club

Danny is ready for spring training. He belongs to the Eagle Ball Club. Danny eats his cereal every morning and his spinach at night. He is fast with a ball, too.

1. Any one of the 9 boys on Danny's team hits the ball about as often as any other player. Last month the team made 83 hits. This is about how many hits for each boy?

2. The boys on Danny's team put in a little money each week from their allowances to use in buying things they need. They put in 54¢ a week altogether. How much does each boy put in each week if all the boys put in equal amounts?

3. Danny bought a little eagle charm for each of the boys to put on his key chain. They were made of wood, and all 9 of them cost 99¢. Find the cost of each one.

4. Jim's mother sent 4 dozen cookies to the field where the boys were practicing. If they were divided so that each boy had an equal share, how many cookies was it possible for each boy to get? How many were left over?

5. The boys put pictures of ballplayers on the walls of their clubhouse. They put the pictures in groups of 8. How many groups of pictures did they have if there were 32 pictures in all?

6. Danny saved his allowance for a long time so he could treat the boys on the team. He saved 85¢. How many 9¢ ice-cream cones could he buy at the dime store? Will he have any money left?

Problems

How Good Are Your Skills?

Do not copy the exercises. Use scratch paper and write the answers. Try for speed and accuracy.

Add:

	a.	b.	c.	d.	e.	f.	g.	h.
1.	17 25 47	29 18 38	35 20 18	43 38 17	37 57 10	47 27 28	15 19 47	47 50 12
2.	15 19 37	19 28 28	28 19 34	37 37 18	55 24 10	42 18 10	67 16 17	18 17 36

Subtract:

3.	67 28	80 34	45 17	37 18	17 9	68 29	50 37	43 17
4.	18 9	34 20	67 18	75 38	47 18	80 46	29 18	60 37

Multiply:

5.	14 × 3	16 × 5	19 × 3	24 × 3	235 × 2	18 × 4	117 × 5	119 × 4
6.	34 × 2	17 × 3	316 × 2	14 × 4	59 × 1	136 × 2	41 × 2	60 × 1

Divide (copy and label any remainders):

	a.	b.	c.	d.	e.	f.
7.	9)96	2)54	3)52	5)60	4)44	4)448

8. Eight 9's = ?   Seven 7's = ?   Nine 9's = ?
9. Five 7's = ?   Eight 8's = ?   Nine 7's = ?
10. Nine 8's = ?   Six 9's = ?   Eight 7's = ?

Unit Review

Find the size of one of the equal parts by writing the names of the places:

1. $2\overline{)42}$ $3\overline{)45}$ $3\overline{)663}$ $2\overline{)742}$ $3\overline{)51}$ $2\overline{)78}$ $3\overline{)78}$

2. $6\overline{)84}$ $2\overline{)70}$ $4\overline{)64}$ $3\overline{)66}$ $5\overline{)80}$ $8\overline{)80}$ $7\overline{)84}$

Find the size of one of the equal parts by thinking the names of the places:

3. $5\overline{)85}$ $6\overline{)78}$ $7\overline{)91}$ $5\overline{)95}$ $6\overline{)96}$ $7\overline{)98}$ $5\overline{)65}$

4. $8\overline{)88}$ $9\overline{)99}$ $8\overline{)96}$ $7\overline{)77}$ $5\overline{)75}$ $4\overline{)68}$ $3\overline{)54}$

5. Divide and check:

$2¢\overline{)34¢}$ $2\overline{)46}$ $3¢\overline{)54¢}$ $2\overline{)62}$ $6¢\overline{)78¢}$ $4\overline{)98}$ $3\overline{)87}$

6. Carl is selling tickets for the Cub Scout powwow. If Mrs. Brown gave him 75¢ for 5 tickets, what was the price of one ticket?

7. Mike put the 48 chairs in groups of 2 in front of the stage. How many groups did he make?

8. How many Indian feathers can Sam buy for the Scouts at 8¢ each if he has 84¢ in den money that he can spend for them?

9. How many nickels is the same amount of money as 35¢? as 45¢? as 65¢? as 85¢?

10. $6 \times 9 = ?$ $9 \times 8 = ?$ $5 \times 9 = ?$ $6 \times 7 = ?$
$8 \times 7 = ?$ $5 \times 8 = ?$ $9 \times 6 = ?$ $8 \times 9 = ?$
$9 \times 4 = ?$ $9 \times 5 = ?$ $7 \times 8 = ?$ $5 \times 7 = ?$
$7 \times 6 = ?$ $8 \times 6 = ?$ $9 \times 7 = ?$ $6 \times 8 = ?$
$7 \times 9 = ?$ $9 \times 9 = ?$ $8 \times 8 = ?$ $7 \times 7 = ?$

Unit Test

1. Tommy, Billy, and Harry have 96 bird pictures altogether. Tell how many each boy will get if the bird pictures are divided evenly among the 3 boys.

2. Mary belongs to the bird club. Last week she saw 49 different birds. If she saw the same number of birds each day in a week, how many did she see each day?

3. How would you divide 56 into 4 equal parts?

4. In the number 34, what place does the 3 hold?

5. Show how 4 boys would divide 68 pennies so that each boy would get the same number.

6. Do this problem and check it by addition, multiplication, and subtraction: $2\overline{)49}$.

7. Do this problem and check it by the way that is easiest for you: $5\overline{)61}$.

8. Divide:

$3\overline{)87} = 3\overline{)60 + \ ?} = \ ?$

$3 \text{ ones}\overline{)6 \text{ tens} + 9 \text{ ones}} = \ ?$

9. Divide:

$3\text{¢}\overline{)54\text{¢}} \qquad 3\text{¢}\overline{)81\text{¢}} \qquad 4\text{¢}\overline{)72\text{¢}}$

$8\overline{)96} = 8\overline{)? \text{ tens} + ? \text{ ones}} = \ ?$

Divide:

	a.	b.	c.	d.	e.
10.	$4\overline{)28}$	$6\overline{)89}$	$5\overline{)70}$	$2\overline{)76}$	$3\overline{)46}$
11.	$8\overline{)64}$	$3\overline{)42}$	$3\overline{)60}$	$9\overline{)54}$	$5\overline{)50}$
12.	$5\overline{)90}$	$3\overline{)57}$	$6\overline{)66}$	$4\overline{)512}$	$4\overline{)66}$

13. Use $10 + 10 + 10 + 2$ to find how many 8's in 32.

14. $48 = 12 + 12 + 12 + 12$. How many 6's in 48?

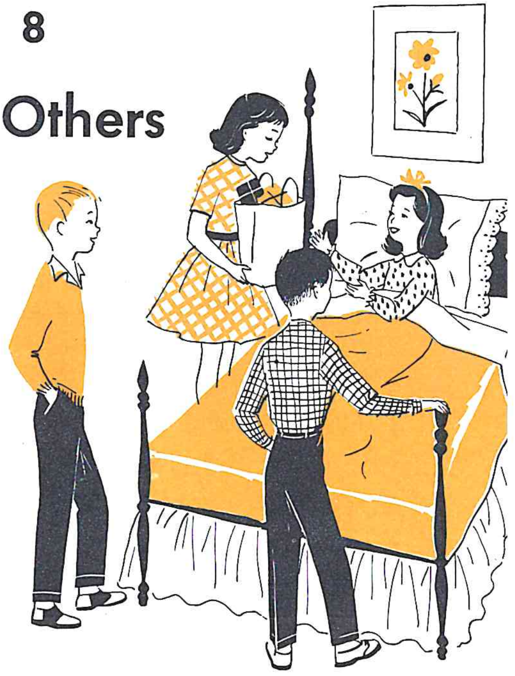
15. If $10 \times 8 = 80$, why does $9 \times 8 = 80 - 8$?

16. How many 3¢ stamps can you buy for a half dollar? How much change will the clerk give you?

17. $3\text{¢}\overline{)10\text{¢} + 10\text{¢} + 10\text{¢} + 10\text{¢} + 2\text{¢}} = \ ?$

UNIT 8

We Help Others



What do you do for the Junior Red Cross?

Do you help out in the Community Chest drive?

Have you ever sold seals to help fight tuberculosis?

If a friend of yours has been ill and absent from school, could you think of something nice to do for him? The boys and girls in this unit will tell you some of the things they do to help others.

When Ellen was sick, the children did so many things for her that she got well very fast.

The Brownies and Bluebirds sell Christmas Seals to help fight tuberculosis. To do this, what would you have to know about money?

The boys and girls in the fourth grade belong to the Junior Red Cross. Sometimes they fill boxes to send to children in faraway lands who need help. They also make things for soldiers who are in hospitals.

Just wait until you see how the children in this unit went to work to help in the Community Chest drive.

1. Did you ever give a part of your money to the Junior Red Cross? What might you have to know about numbers if you were to do this? Could fractions be used? Do you know what a fraction is?

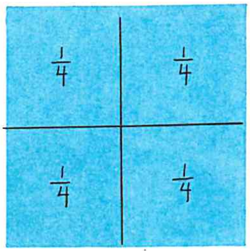
2. Some of the children made cookies and candy to make more money. How do you think they used fractions?

3. Did you ever buy a quarter of a pound of candy? What does a quarter of a pound mean?

4. Did anyone ever ask you to meet them at a quarter to three? This is how many minutes before 3 o'clock?

5. Did you ever buy anything on sale? What does "$\frac{1}{2}$ off" mean?

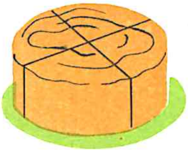
6. Did you ever buy $\frac{3}{4}$ of a dozen rolls for your mother? How many rolls did you buy?

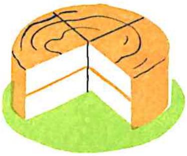


Numbers Tell You Things

A fraction is a number; it tells the how-much or how-many of something. Let's see how it does this.

If you cut a sheet of paper into 4 equal parts, you say that one of the equal parts is a quarter of the whole or one-fourth ($\frac{1}{4}$) of it. The number $\frac{1}{4}$ is a fraction.





You have one of the four equal parts of the cake, or $\frac{1}{4}$ of it, removed. There are three of the four equal parts, or $\frac{3}{4}$ of the cake, left.

In the fraction $\frac{1}{4}$, the 4 under the line tells you how many equal parts there are in the whole. Is this also true about the 4 in the fraction $\frac{3}{4}$?

In $\frac{1}{4}$, the 1 over the line tells you how many of the equal parts you are using. Is this also true for the 3 in $\frac{3}{4}$?

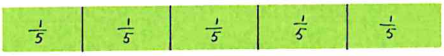
Do you understand that:

a. One-fourth, or $\frac{1}{4}$, is 1 of the 4 equal parts of a whole?

b. Three-fourths, or $\frac{3}{4}$, is 3 of the 4 equal parts of a whole?

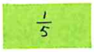
c. Four-fourths, or $\frac{4}{4}$, is 4 of the 4 equal parts of a whole, or all of it?

This box has been divided into five equal parts.

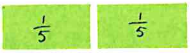


Tell why you can write the following:

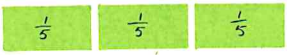
This is $\frac{1}{5}$ of the box:



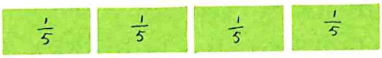
This group is $\frac{2}{5}$ of the box:



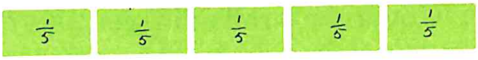
This group is $\frac{3}{5}$ of the box:



This group is $\frac{4}{5}$ of the box:



This group is $\frac{5}{5}$ of the box:

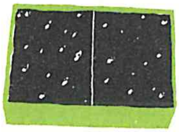


United Crusade

The children's teacher read to them about Community Chest and Red Feather drives. These are often called the United Crusade. The children found out that part of the money from the Crusade went to the Campfire Girls, the Boy Scouts and Girl Scouts, the Y.W.C.A. and Y.M.C.A., and many other important groups.

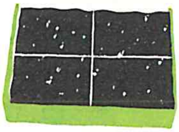
"How can we help out?" they all wanted to know. No one could think of a way. Then Jimmy said, "I know! We can make candy at home and sell it."

Tim brought his pan of candy to school the next day. He did not know how large to cut the pieces. The other children helped him.



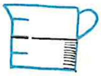
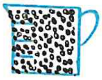
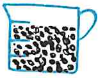
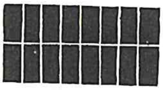
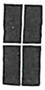
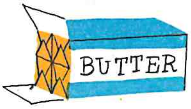
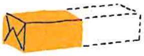
First Tim cut the candy into 2 equal parts. One part is one-half of the whole. The parts are called halves.

What does the 2 in the fraction $\frac{1}{2}$ tell you? the 1? $\frac{1}{2}$ and $\frac{1}{2}$ = 1 whole. $\frac{2}{2}$ = 1 whole. Why?



Then Tim cut the candy into 4 equal parts. Each part is one-fourth of the whole. One-fourth can be written like this: $\frac{1}{4}$. Why?

Here are some of the things the children used to make candy. See if you can tell what parts were used:

Wholes		**Parts the Children Used**	
1 cup		Ann used this much milk.	
1 cup		Pete used this many nuts.	
1 bar		Mac used this much chocolate.	
1 lb.		Henry used this much butter.	

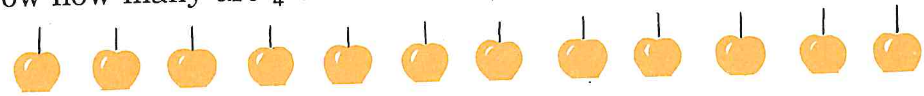
Seeing the Fractional Parts of Wholes

A Candy Sale

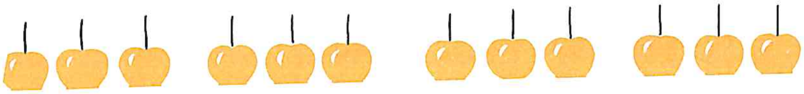
The fourth grade decided to have their candy sale at school. They started selling at noon on Monday.

Miss Jones sent a note asking them to save $\frac{1}{4}$ dozen candy apples for her.

"How many is that?" Jack asked. "Here is a dozen. Now how many are $\frac{1}{4}$ of them?" 12 things = 1 dozen.

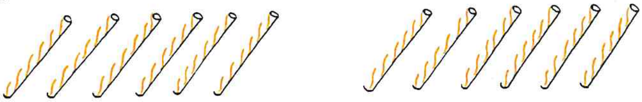


"I know," Tom said. "We have to divide them into 4 equal groups. Each one of these groups is $\frac{1}{4}$ of a dozen."


$\frac{1}{4}$ doz.
$\frac{1}{4}$ doz.
$\frac{1}{4}$ doz.
$\frac{1}{4}$ doz.

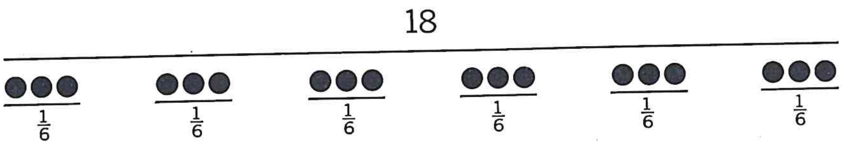
A little girl bought a half dozen peppermint sticks. The children knew that $\frac{1}{2}$ dozen would be 12 divided into 2 equal parts.

$\boxed{2\overline{)12} = ?}$


$\frac{1}{2}$ doz.
$\frac{1}{2}$ doz.

A big boy bought $\frac{1}{6}$ of the candy eggs they had left. If they had 18 candy eggs left, how many did he buy?

$\boxed{6\overline{)18} = ?}$

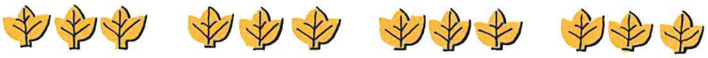


A part of something may mean that you are dividing one thing into parts or dividing a group into equal groups. Can you show that this is true by using pictures?

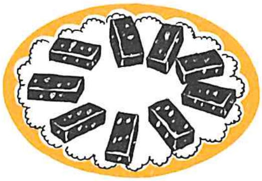
Using More Than One of the Equal Parts

Linda wanted three-fourths of a dozen pieces of maple candy. Jerry thought, "I know how many one-fourth ($\frac{1}{4}$) of a dozen pieces would be. It is one of the 4 equal parts. But how can I find how many three-fourths of a dozen pieces would be? It must be 3 of the 4 equal parts. That would be $\frac{3}{4}$ of them." Tell why.

Then he thought, "If $\frac{1}{4}$ of 12 is $4\overline{)12} = 3$, then $\frac{3}{4}$ must be 3 of the $\frac{1}{4}$'s, or $3 \times 3 = 9$ pieces."



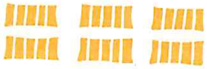
$$\underbrace{\tfrac{1}{4}\text{ doz.} \qquad \tfrac{1}{4}\text{ doz.} \qquad \tfrac{1}{4}\text{ doz.}}_{\tfrac{3}{4}\text{ doz.} = 9\text{ pieces}} \qquad \tfrac{1}{4}\text{ doz.}$$

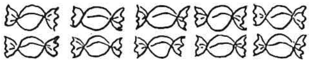


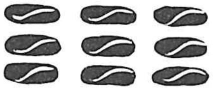
Jerry knew what to do when a girl asked for two-thirds of these nut bars. First he divided the nut bars into 3 equal parts because one part is one-third ($\frac{1}{3}$). Two of the parts would be two-thirds ($\frac{2}{3}$).

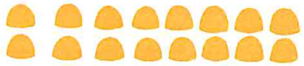
Then Jerry found out how many 2 of these $\frac{1}{3}$'s were. How many were there in $\frac{2}{3}$ of 9 pieces?

1. Help Jerry find out how many pieces in these:

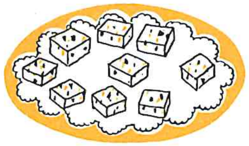
a. $\frac{1}{2}$ of these: 

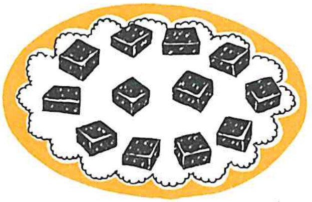
b. $\frac{4}{5}$ of these: 

c. $\frac{2}{3}$ of these: 

d. $\frac{5}{8}$ of these: 

2. Now it is your turn to sell at the candy sale. Tell how many pieces you would sell for each of these:

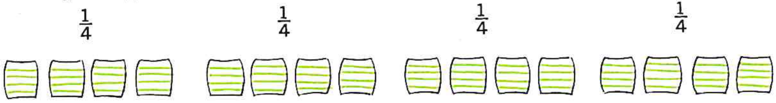
a. $\frac{1}{3}$ of these: 

b. $\frac{1}{6}$ of these: 

Selling Candy

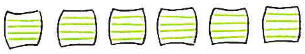
Jerry filled the plate with mint puffs until he had 16 pieces. He practiced on this problem: $\frac{3}{4}$ of 16 pieces.

The whole is 16 pieces. The 4 in $\frac{3}{4}$ of anything says it must be divided into 4 equal parts. When 16 things are divided into 4 equal parts, we get 4 in each part. Then, 3 of these equal parts = 3 × 4 = 12 pieces.

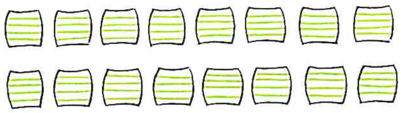


Help Jerry find out how many pieces there are in these amounts:

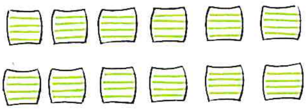
1. $\frac{1}{2}$ of these:



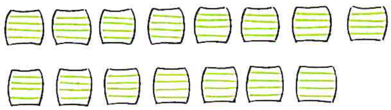
2. $\frac{7}{8}$ of these:



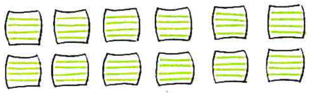
3. $\frac{2}{3}$ of these:



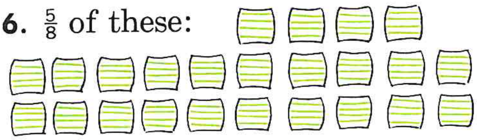
4. $\frac{4}{5}$ of these:



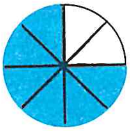
5. $\frac{3}{4}$ of these:



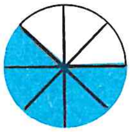
6. $\frac{5}{8}$ of these:



7. How many $\frac{1}{8}$'s are shaded in each of these circles? Write the fractions:



$\frac{?}{8}$



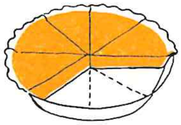
$\frac{?}{8}$

8. Find $\frac{4}{5}$ of 20 pieces of chocolate candy.

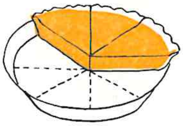
Practice in Finding Parts of Groups

Visiting a Friend

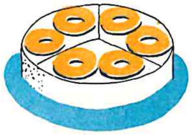
Ellen is ill. She must stay in bed two more weeks. Her friends in the fourth grade went to see her.



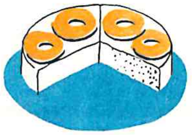
1. Ellen's mother, Mrs. Collins, gave 2 of Ellen's friends a piece of pie. The pie looked like this before she gave each of them a piece.



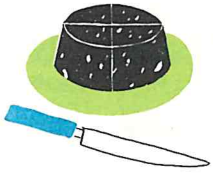
Now it looks like this. How many pieces less are there now than before? What part of the pie is left? Which is more, $\frac{3}{8}$ or $\frac{5}{8}$? How much more?



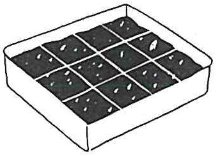
2. Three of the boys went to see Ellen after ball practice. Mrs. Collins knew they were as hungry as bears. She cut a small upside-down cake for them. How many pieces did she cut? What is each piece called?



How many pieces are left after 1 boy is given a piece? What fraction of the cake is left? Which is more, $\frac{1}{3}$ or $\frac{2}{3}$?

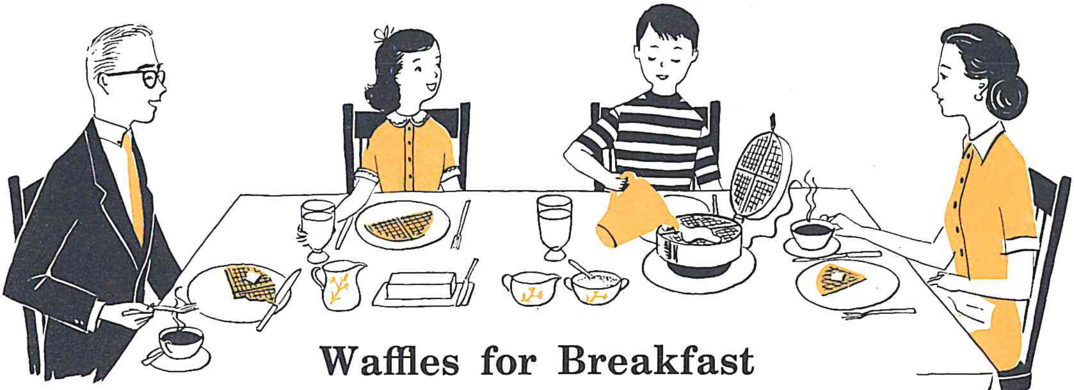


3. Betty brought a small plum pudding to Ellen. Ellen cut it so she and Betty could each have a piece. Into how many pieces did she cut the pudding? If each girl has one piece, how many pieces will be left? What fraction of the plum pudding will be left? Which is less, $\frac{2}{4}$ or $\frac{4}{4}$? How much less?



4. Edith made brownies for Ellen. She cut the pan of cake into 12 pieces. Each piece is what part of the whole? Each piece is a brownie; how many are half of them?

Using Fractional Parts

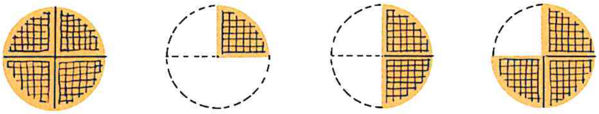


Waffles for Breakfast

Harry likes to cook the waffles when his family have them for breakfast. He knows just how long to leave them in the iron so that they will be cooked to a golden brown.

One night Harry and his sister had fun figuring out things about fractions from the waffles. These are some of the things they discovered:

2 fourths of a waffle = $\frac{1}{2}$ of a waffle; $\frac{2}{4} = \frac{1}{2}$.
4 quarters of a waffle = 1 whole waffle; $\frac{4}{4} = 1$.
$\frac{3}{4}$ of a waffle is $\frac{1}{4}$ more than $\frac{1}{2}$ of a waffle, so $\frac{3}{4}$ of any whole is larger than $\frac{1}{2}$ of it.

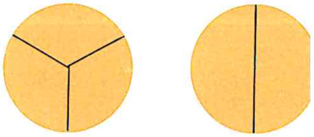


1. Can you answer these questions (use the picture)?

a. Which is more, 3 waffles or $\frac{6}{2}$ waffles? Why?
b. How many fourths in 3 waffles? in 4 waffles?

2. Tell why five halves ($\frac{5}{2}$) of Harry's waffles = 2 whole waffles and one-half ($\frac{1}{2}$) waffle more.

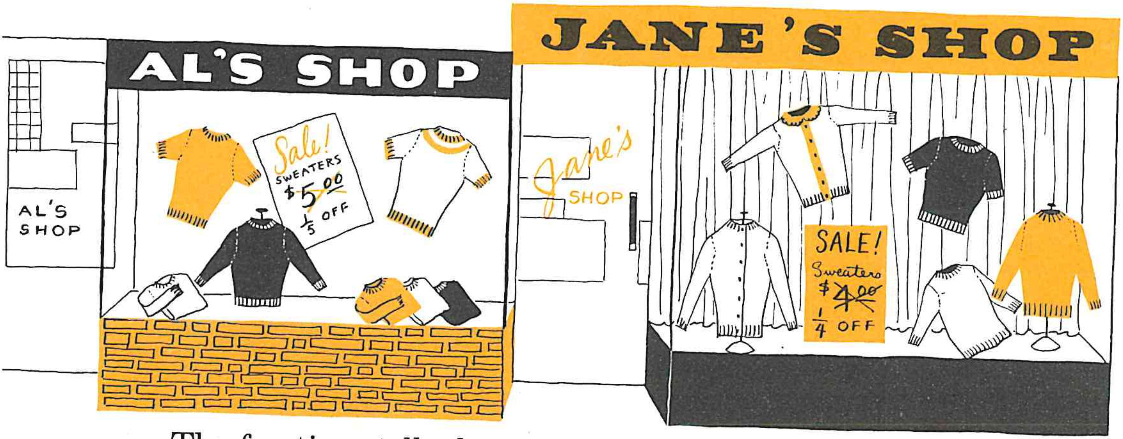
3. The three equal parts of a whole are more parts than the two equal parts of it. Why does this tell you that the fraction $\frac{1}{3}$ is less than the fraction $\frac{1}{2}$?



A Sweater for Ellen

Ellen's friends decide to fix a grab bag for her. Each of her friends will wrap up a present for Ellen. The presents will be put into a bag. She may reach in and take out a present once in the morning and once in the afternoon.

Some of the girls are putting their money together so they can buy a sweater for Ellen. This is what they saw in two store windows:



The fractions tell what part of the price they can save.

1. Into how many parts has the price of the sweaters in Al's window been divided?

How much is $\frac{1}{5}$ of $5.00? $5\overline{)\$5.00} =$? Why do you divide by 5?

When you get an amount off, it means that you subtract it from what the sweater cost before the sale. How much does the sweater cost now?

2. The girls decide to buy one of the sweaters in Jane's Shop. What number tells you the number of parts into which the $4.00 is to be divided? What is $\frac{1}{4}$ of $4.00? $4\overline{)\$4.00} =$? Why do you divide by 4?

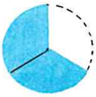
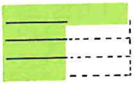
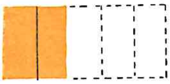
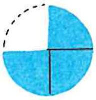
If the girls subtract this amount from $4.00, how much will they pay for the sweater?

Something for You and Ellen to Do

The boys and girls are making up some problems about fractions for Ellen to do. Here are their problems.

Jenny's problem:

Tell what part is missing in these wholes:

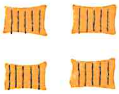
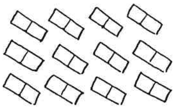
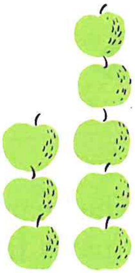
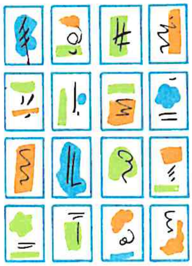
Martin's problem:

Fill in the blanks to show how many equal parts in a whole:

$\overset{3}{\frac{?}{3}} = 1$ $\overset{8}{\frac{?}{8}} = 1$ $\overset{2}{\frac{?}{2}} = 1$ $\overset{5}{\frac{?}{5}} = 1$ $\overset{4}{\frac{?}{4}} = 1$ $\overset{6}{\frac{?}{6}} = 1$ $\overset{10}{\frac{?}{10}} = 1$

Carol's problem:

Find $\frac{3}{4}$ of these amounts:

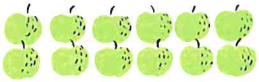
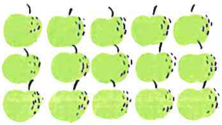





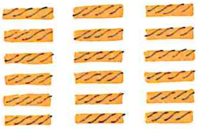
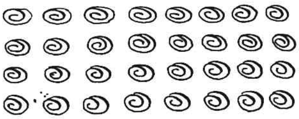
Jack's problem:

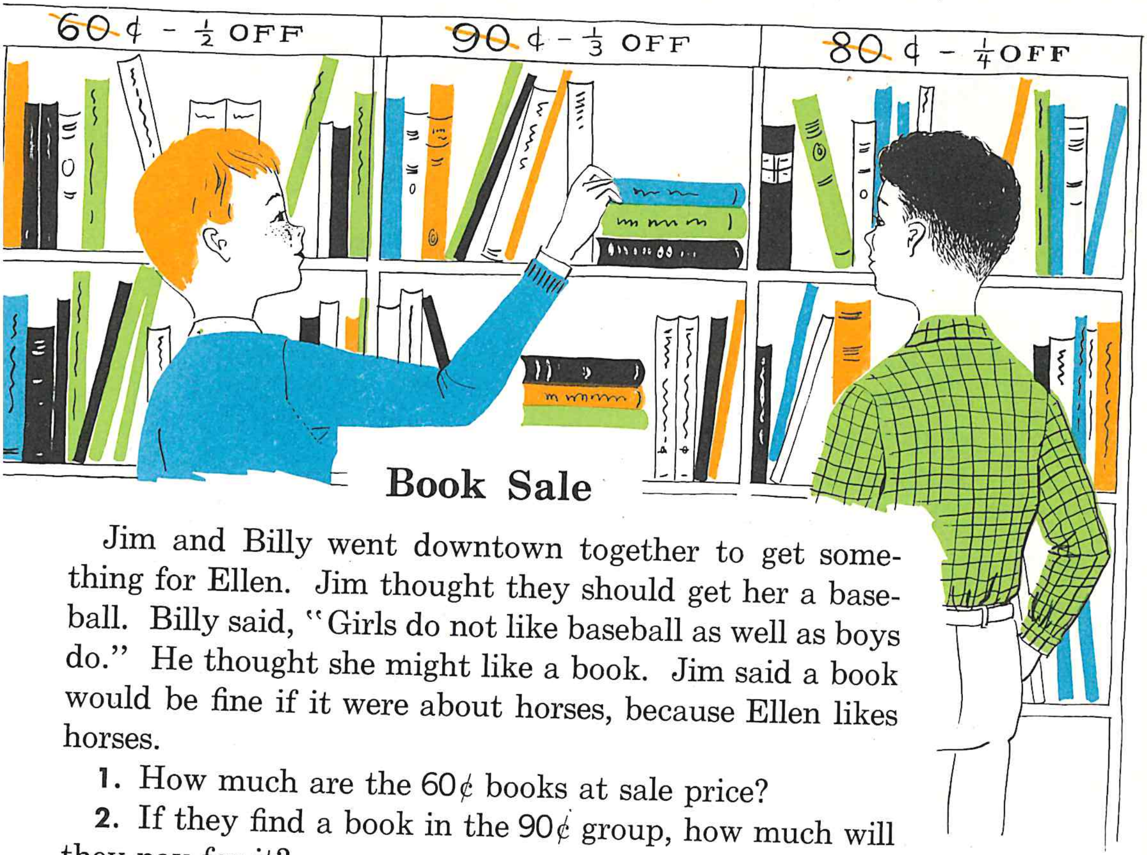
a. Draw a circle and divide it into thirds ($\frac{1}{3}$'s).
b. Draw a pie and divide it into eighths ($\frac{1}{8}$'s).

Marilyn's problem:

Write which you would rather have:

a. $\frac{1}{2}$ of these:  or $\frac{1}{3}$ of these: 

b. $\frac{1}{3}$ of these:  or $\frac{1}{4}$ of these: 



Book Sale

Jim and Billy went downtown together to get something for Ellen. Jim thought they should get her a baseball. Billy said, "Girls do not like baseball as well as boys do." He thought she might like a book. Jim said a book would be fine if it were about horses, because Ellen likes horses.

1. How much are the 60¢ books at sale price?

2. If they find a book in the 90¢ group, how much will they pay for it?

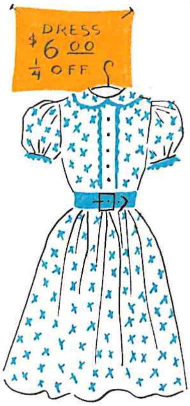
3. They found the book they wanted in the 80¢ group. Find the cost of the book.

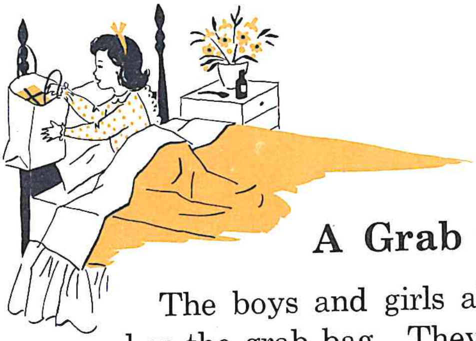
4. Dick is going to give Ellen $\frac{1}{4}$ of his best marbles. He has 24 agates that he thinks are the best he has. How many will he give her?

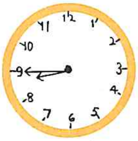
5. Ken is going to make something for Ellen. He has a square piece of balsa wood 1 foot long. Ken is going to use $\frac{1}{3}$ of it to carve a dog for Ellen. How many inches will he use?

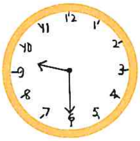
6. Mary saw animal cookies for 18¢ in one store. She saw a box of fig cookies for $\frac{1}{2}$ as much. How much did the fig cookies cost?

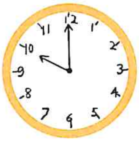
7. Find how much you could save on this dress.











A Grab Bag for Ellen

The boys and girls all went to Ellen's house to give her the grab bag. They hung it on her bed post. They told her she could reach in and take one present out at a quarter-past 10 in the morning and one at half-past 3 in the afternoon. My, how excited Ellen was!

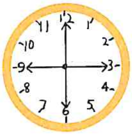
Ellen watched the clock the next morning.

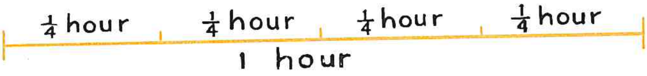
1. What time was it when she first looked at it?

2. What time was it the next time she looked at it?

3. The third time she looked, she thought she had only a quarter of an hour to wait until she could open a present. Was she right? How do you know?

4. Look at the pictures of an hour divided into four equal parts.

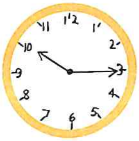


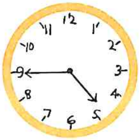


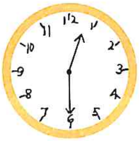
How many minutes is $\frac{1}{4}$ of an hour? Why can you also say a quarter of an hour, instead of one-fourth of an hour?

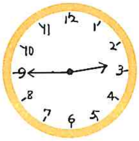
5. Why is it right to say it is 45 minutes after 8 o'clock or a quarter to nine? Draw a clock and show this time.

6. Look at these clocks and tell what time it is by saying it in two different ways.

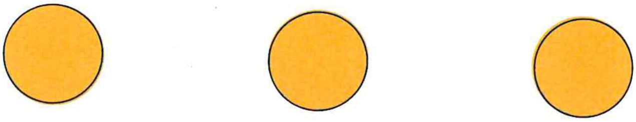








Time Values in Fractional Parts



Something to Do Together in Class

Today you will use paper circles. Be sure you have 1 white circle. That will be your whole circle. You will not divide it into parts.

You will keep 1 white circle on which to lay your fractional parts. This will show you what part of a whole you have used.

Use a third circle and fold it into halves by turning the bottom up to the top to find the middle. Cut it into two equal parts. The two parts are called *halves.* $\frac{2}{2}$ tells you that you have two halves in a whole. Why? $\frac{2}{2} = 1$. Why? Prove this by putting both $\frac{1}{2}$'s on your white circle. Lay the white circle over it to prove it is one whole.

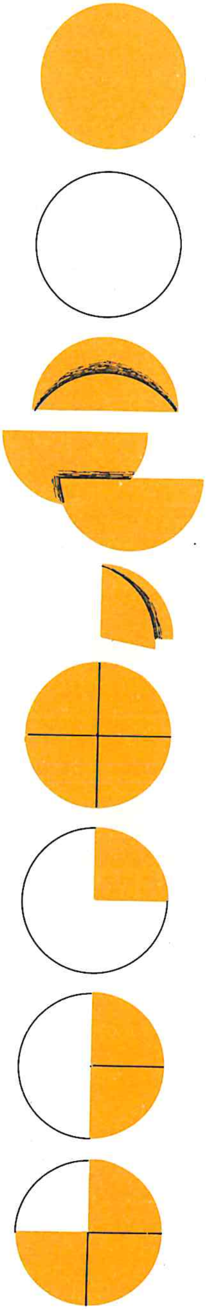
Two of the $\frac{1}{2}$'s = one whole. Two $\frac{1}{2}$'s = 1.

Use another circle and fold it into halves. Cut it into two pieces on the fold. Now take each half and fold one side over to the other side. Cut each half into two equal pieces. Each piece is $\frac{1}{4}$. Why?

$\frac{1}{4}$ = one of four equal parts. Why?

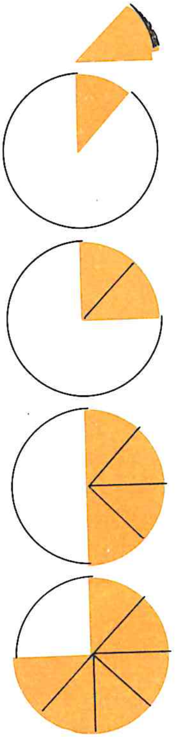
Take the white circle and place one of these $\frac{1}{4}$'s on it. Do you see what part of the whole circle it is? Now put 2 of the fourths on the white circle. What part of the whole circle is covered now? Why? Put one of your half pieces over the two $\frac{1}{4}$'s to prove that $\frac{2}{4} = \frac{1}{2}$.

Put 3 of the $\frac{1}{4}$'s on the white circle. How much of the white circle is covered? Put 4 of the fourths on the whole circle. $\frac{4}{4} = 1$. Why? Prove it by putting the white circle over the four $\frac{1}{4}$'s. Four $\frac{1}{4}$'s = one whole. Write $\frac{1}{4}$ on each of these parts.



Finding Relationships Between Parts of a Whole

More Class Work



Use another circle and cut it into halves. Then cut a half into two equal parts. These are fourths. Use one of them and fold one side over to meet the other side. Now cut each $\frac{1}{4}$ into two equal parts. Each of these equal pieces is $\frac{1}{8}$. Why?

Put $\frac{1}{8}$ on the white circle. Is $\frac{1}{8}$ as much as $\frac{1}{4}$ if you are using equal parts of one whole?

Put two of the $\frac{1}{8}$'s on the white circle. What other part of the circle just covers them? What does $\frac{2}{8}$ equal in size?

Put four of the $\frac{1}{8}$'s on the white circle. What other part of the circle will just cover them? Use the piece of the circle that will prove it.

Put six of the $\frac{1}{8}$'s on the white circle. How much of the circle is covered? Place three of these quarter-size pieces over the six $\frac{1}{8}$'s. What is another way to tell what part of the circle is covered?

Use your fractions to find the answers to these:

1. How many $\frac{1}{8}$'s are there in one-half?
2. How many $\frac{1}{2}$'s are there in a whole?
3. How many eighths are there in $\frac{3}{4}$?
4. How many fourths are there in a whole?
5. How many $\frac{1}{8}$'s are there in $\frac{1}{4}$ of 2 wholes?
6. How many $\frac{1}{2}$'s are there in a half?
7. How many $\frac{1}{8}$'s are there in a whole?
8. How many $\frac{1}{4}$'s are there in 2 wholes?
9. If there are four $\frac{1}{4}$'s in a whole, how many would there be in a whole and half of another whole?
10. How much is half of a half?
11. How much is half of a fourth?
12. There are two $\frac{1}{8}$'s in a quarter of a whole. Then how many are there in two quarters?

Junior Red Cross

Each pupil has his name on the list of members of the Junior Red Cross. Each of them will get a pin.

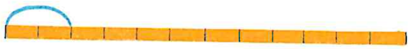
1. Joe was to pass out the Junior Red Cross pins. He had pins for only 6 children. If there are 24 children in the room, what fractional part of the group received pins?

2. Joe went to the school office to get more pins so that each boy and girl could have one. How many more did he get?

Let's take a good look at a fraction. You have seen how the number under the line tells the number of parts into which a whole has been divided. You know that the number over the line tells you the number of parts that you are using.

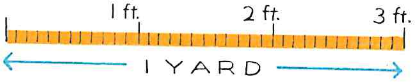
3. Tell what fractional part of the whole you are using in each of these:

a.



2 inches out of a foot:
$\frac{2}{12}$ or $\frac{1}{6}$ Why?

b.



1 foot out of a yard:
$\frac{12}{36}$ or ?

c.

50¢ out of one dollar:
$\frac{50}{?}$ or ?

d.

25¢ out of one dollar:
$\frac{?}{100}$ or ?

Finding the Value of a Part

Practice with Parts of a Whole

A

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1. Tell how the whole is divided in each of the tables given above.
2. Tell how many fourths make a half of a whole.
3. How much is a half of a half of a whole?
4. How many eighths make a half of a whole?
5. How many eighths make a fourth of a whole?
6. How much is a half of a fourth of a whole?
7. How many eighths in three-fourths of a whole?

8.

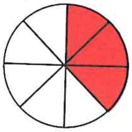
a.	b.	c.	d.	e.
$\frac{1}{2} = \frac{?}{4}$	$\frac{1}{2} = \frac{?}{8}$	$\frac{1}{4} = \frac{?}{8}$	$\frac{3}{4} = \frac{?}{8}$	$\frac{?}{8} = 1$

9. How many sixths are there in a half of a whole?
10. How many sixths are there in a third of a whole?
11. How many twelfths are there in a half of a whole?
12. How many twelfths are there in a third of a whole?
13. How many eighths are there in a whole?
14. How many sixths are there in a whole?
15. How many twelfths are there in a whole?
16. Tell why two $\frac{1}{8}$'s = $\frac{1}{4}$; two $\frac{1}{12}$'s = $\frac{1}{6}$.

How Well Have You Learned?

1. Tell what part of the whole is colored:

a.



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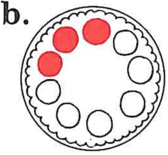
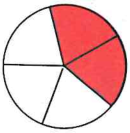
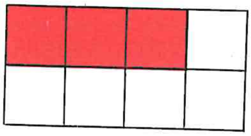


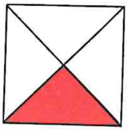
c.



d.



e.



2. Find the number of pieces of candy in:

a. $\frac{3}{8}$ of 24 pieces　**b.** $\frac{2}{9}$ of 18 pieces
c. $\frac{2}{3}$ of a dozen pieces　**d.** $\frac{3}{5}$ of 20 pieces

3. Draw squares and color these parts:

a. $\frac{1}{2}$　**b.** $\frac{3}{4}$
c. $\frac{3}{8}$　**d.** $\frac{5}{8}$

4. Find the cost of these things:

Dress, \$9 — $\frac{1}{3}$ off.
Shoes, \$6 — $\frac{1}{2}$ off.

5. What does the number below the line in a fraction tell you? the number above the line?

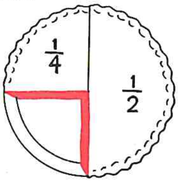
6. You use zero (0) as a figure sometimes. Could a thing like $\frac{0}{4}$ have any meaning?

7. What is the name of one part of a whole that has been divided into 2 equal parts? into 4 equal parts? into 8 equal parts?

8. Does $\frac{2}{4}$ of a whole equal $\frac{1}{2}$ of it? Why?

9. What does $\frac{2}{2}$ of a whole mean? Is it equal to $\frac{4}{4}$ of it?

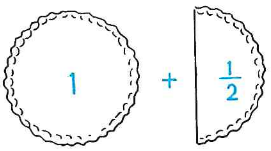
10. Use this picture and tell why $\frac{1}{2}$ and $\frac{1}{4}$ together are as much as $\frac{3}{4}$ of the whole.



Filling Red Cross Boxes

The children in Miss Wells' room had a good time bringing things for the Junior Red Cross boxes. Last year they got a letter from children in Italy. The letter thanked them for the things they had sent.

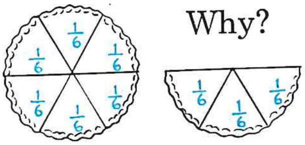
Ann's mother sent 6 apple pies to school so the boys and girls could have a party after the boxes were filled.



They had this much pie left after everyone had a piece. How much is left? One and one-half is written as $1\frac{1}{2}$ in numbers. You read it "one and one-half."

One and one-half ($1\frac{1}{2}$) is a **mixed number.** It is called a mixed number because it is a whole number and a fraction together. You see from the picture that it is a way of writing $1 + \frac{1}{2}$. The addition sign is left out.

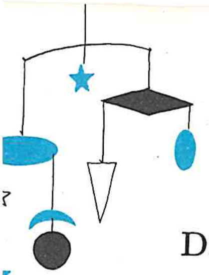
You can write one and one-half of something as a fraction. You see that a whole has been divided into 2 equal parts. How many $\frac{1}{2}$'s are there in 1 whole pie? Do you see that you have 3 halves in $1\frac{1}{2}$? 3 halves is written $\frac{3}{2}$. Why?

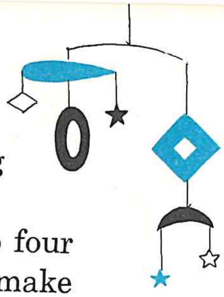


Ann cut the pie that was left. Into how many pieces did she cut the whole pie? How many pieces are in the half-pie?

Why will you put 6 below the line when you write the fraction that tells how Ann cut the pie?

What number would you put above the line to show how many sixths of a pie Ann had in the $1\frac{1}{2}$ pies? $1\frac{1}{2} = \frac{?}{6}$

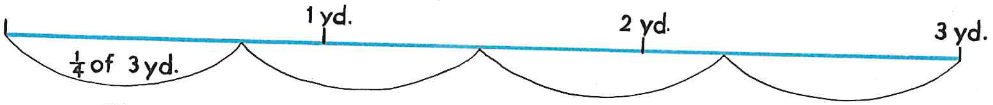




Making Mobiles

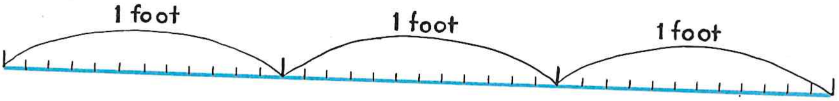
The Junior Red Cross members are making mobiles for the soldiers in hospitals.

David is going to divide 3 yards of thin wire into four equal parts. He wants to know how long he should make each piece. He wants $\frac{1}{4}$ of 3 yards. He divided the wire this way.



How long is $\frac{1}{4}$ of 3 yards? "The only way that I can find how long the piece is would be to use a yardstick.

First, I will change 1 yard into smaller parts; 1 yard = 36 inches.

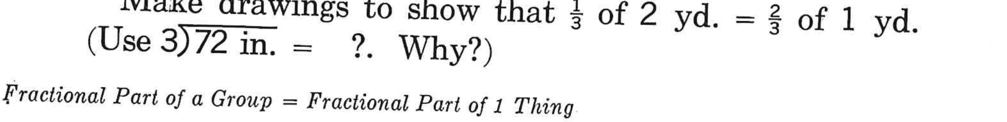


1 yard

If I think, 1 yard = 36 inches, then 3 yards = 3 × 36 inches, or 108 inches. Then I can find the length of $\frac{1}{4}$ of 3 yards.

$\frac{1}{4}$ of 3 yards = $\frac{1}{4}$ of 108 inches = $4\overline{)108 \text{ inches}}$ = 27 inches. (Divide $4\overline{)108}$ and see if 27 is the right answer. Remember that 108 = 10 tens and 8 ones.)

I can now measure equal lengths of 27 inches."



Tell why his 27 in. = $\frac{3}{4}$ yd. (Use counting.)

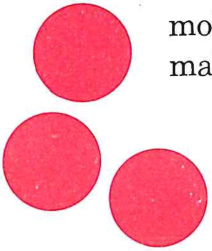
Does $\frac{1}{4}$ yd. = 9 in.? ($4\overline{)36 \text{ in.}}$ = ?)

If there are 9 in. in $\frac{1}{4}$ yd., why are there 27 in. in $\frac{3}{4}$ yd.?

Make drawings to show that $\frac{1}{3}$ of 2 yd. = $\frac{2}{3}$ of 1 yd. (Use $3\overline{)72 \text{ in.}}$ = ?. Why?)

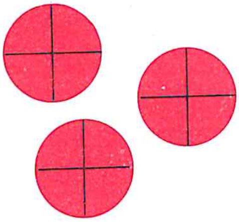
Fractional Part of a Group = Fractional Part of 1 Thing

Making More Mobiles



Paul said, "I will cut the pieces of red paper for the mobiles. I'll draw circles and cut them into fourths to make the pieces."

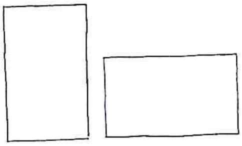
Paul had 3 circles cut out. Four children needed some of the pieces. How many pieces could each of them have?



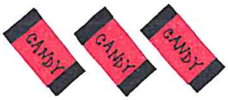
To find the answer, Paul knows it will be easier to figure out how many pieces each child will have when the 3 circles have been divided into smaller parts. Since there are 4 children wanting pieces, he divided each circle into four equal parts. What is each part called?

How many of these equal parts are there in 3 circles? Write a fraction that gives the part of a whole circle that each child could have.

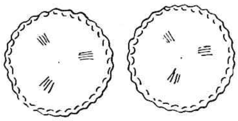
Draw pictures and divide these things into equal parts to find how much each child will get:



1. Four children are going to divide 2 large sheets of paper equally. What part of a sheet will each child receive?



2. Four children are going to divide these candy bars equally. What part of 1 bar will each child receive?



3. There are 8 people in the Smith family. How large a piece of pie can each of them have if these pies are shared equally?

Pat and His Friends Do Some Figuring

Pat has a problem. He wants to give part of his money to the Junior Red Cross.

1. Pat has \$1.50. If he spends $\frac{1}{2}$ of it for a movie, how much will he have left? When you want $\frac{1}{2}$ of a number, why do you divide it by 2?

$\boxed{2\overline{)\$1.50} = \ ?}$

2. Pat decides he will not go to the movie this week and will give $\frac{1}{3}$ of his money to the Junior Red Cross. How much is $\frac{1}{3}$ of his money?

$\boxed{3\overline{)\$1.50} = \ ?}$

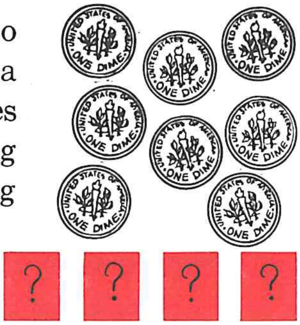
3. Sue has saved 75¢. She is going to give $\frac{1}{5}$ of this amount to the Junior Red Cross. How much will she have left?

$\boxed{5\overline{)75¢}}$

4. Mary has saved \$3.00. She decided to spend $\frac{1}{3}$ of it for school supplies. How much will she spend and how much of the \$3.00 will she have left?

$\boxed{3\overline{)\$3.00}}$

5. Kate got 80¢ for her birthday. She wants to save $\frac{1}{4}$ of it to put in the school bank. She also has a long list of things she wants to buy. So she decides to save $\frac{1}{4}$, spend $\frac{1}{2}$, and keep the rest for something she may want later. What is the amount she is going to keep?



a. She is putting $\frac{1}{4}$ of 80¢ in the school bank. Show that $\frac{1}{4}$ of 8 dimes is 20¢. $4\overline{)80¢} = \ ? \ ¢$

b. She is spending $\frac{1}{2}$ of her money. How much is she spending? $2\overline{)80¢} = \ ? \ ¢$

c. Write the amounts she put in the bank and what she will spend. Find how much these are altogether.

d. Find how much of the 80¢ is left.

6. How much is $\frac{1}{4}$ of 64? of 96?

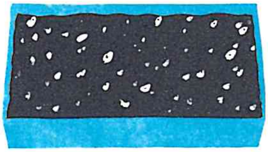
7. Which is more, $\frac{1}{2}$ or $\frac{1}{3}$ of 60? How much more?

8. $\frac{1}{5}$ of 80 = ? $\frac{1}{6}$ of 90 = ? $\frac{1}{2}$ of 72 = ?

9. How much is $\frac{1}{7}$ of 84¢?

Fractional Parts by Division

Be Sure You Understand



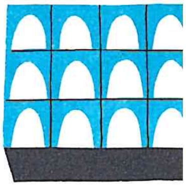
1. Divide this pan of candy into six equal parts, then finish these sentences:

a. One part of the pan of candy will be ? of the whole.

b. Two of the equal parts = $\frac{2}{6}$ or ? of the whole.

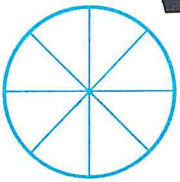
c. Four of the equal parts = ? or ? of the whole.

d. How many sixths in a whole? The fraction is ?.



2. How many eggs are there in this box? Find how many there are in $\frac{2}{3}$ of a box.

3. How many eggs are there in $\frac{3}{4}$ of a dozen? in $\frac{1}{6}$ of a dozen?



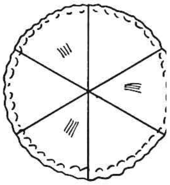
4. Use this picture and tell why:

a. $\frac{4}{8}$ of a whole = $\frac{2}{4}$ of it.

b. $\frac{2}{4}$ of a whole = $\frac{1}{2}$ of it.

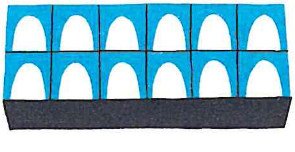
5. Can we think like this (using the picture of the circle above)?

a. If a whole is divided into eight equal parts, then four of the parts would be half of them, or $\frac{4}{8} = \frac{1}{2}$.



6. A pie is cut into 6 pieces. If three of them are eaten, tell why $\frac{3}{6} = \frac{1}{2}$. What fractional part of the whole pie is left if $\frac{1}{2}$ has been eaten?

7. Use the picture above in Problem 6 and tell why $\frac{2}{6} = \frac{1}{3}$.



8. Tell why 6 eggs are half of a dozen. Does $\frac{6}{12}$ mean the same as $\frac{1}{2}$? Why?

9. Why is one-fourth ($\frac{1}{4}$) of a pie less than one-third ($\frac{1}{3}$) of it?

10. Use the picture in Problem 8 and tell why 8 eggs = $\frac{2}{3}$ of a dozen. ($\frac{8}{12} = \frac{2}{3}$)

Practice with Fractional Parts

1. A half of anything means that it has been divided into two equal parts and you are using one part.

a. Find $\frac{1}{2}$ of this line.
b. Find $\frac{1}{2}$ of 18 miles.

2. A third ($\frac{1}{3}$) of anything means that it has been divided into three equal parts and you are using one part. Divide these amounts by 3 to find $\frac{1}{3}$:

a. 15 cows
b. 72¢
c. 21 candy bars
d. 24 apples
e. 84¢
f. 6 candy canes
g. 72 houses
h. 96¢
i. 45 pieces of gum

3. A fourth ($\frac{1}{4}$) of anything means that it has been divided into four equal parts and you are using one part. Divide these amounts by 4 to find $\frac{1}{4}$:

a. 24 children
b. 32 feet
c. 484 miles
d. $4.00
e. 72 miles
f. $4.64

4. The children in the fourth grade brought 16 bars of soap for the Red Cross boxes. Martin is going to put $\frac{1}{4}$ of them into the box he is packing. How many bars of soap will go into his box?

5. Jane counted the boxes of crayons and found there were 24 boxes. How many boxes of crayons can go into each of 3 Red Cross boxes if the 24 boxes are to be divided equally?

6. Jimmy brought 18 pencils for the Red Cross boxes. Nancy is going to put $\frac{1}{3}$ of them in the box she is packing. How many pencils is Nancy packing in her box?

7. Joan's family is going on a trip. They will drive 86 miles in all. If they drive $\frac{1}{2}$ of this distance the first day, what distance do they still have to drive?

Bagging Peanuts

Marian's Bluebird group is going to fill 90 small paper bags with peanuts. They are going to sell these bags of peanuts at the school fair.

There are 90 bags to fill. Three of the girls are going to share the work equally.

1. Marian needs to know how many bags she should count out for each of the 3 girls. Must she give each girl $\frac{1}{3}$ of them if there are 3 girls and each gets an equal share? $3\overline{)90} = 30$, or $\frac{1}{3}$ of all of the bags.

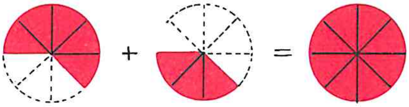
$\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3}{3} = 1$ whole. Why?

Is Marian thinking correctly here? Is it because the 1's tell how many parts are being used and the 3's tell the size of the parts? This is called adding like fractions. Why?

2. If Marian should give $\frac{1}{5}$ of the bags to each of 3 different groups, what fractional part of all the bags was given out? $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{?}{5}$

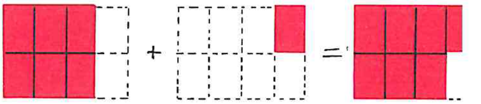
3. Would three $\frac{1}{4}$'s be equal to $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$? Why?

4.



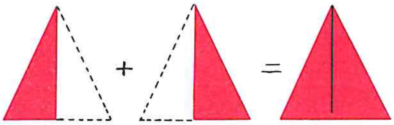
$\frac{5}{8} + \frac{3}{8} = \frac{8}{8}$?

5.



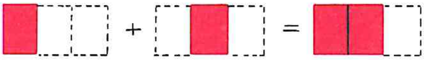
$\frac{6}{8} + \frac{1}{8} = \frac{7}{8}$?

6.



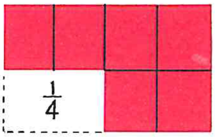
$\frac{1}{2} + \frac{1}{2} = \frac{?}{2} = \frac{3}{2}$? = 1 1/3

7.



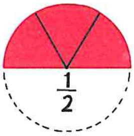
$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$?

8.



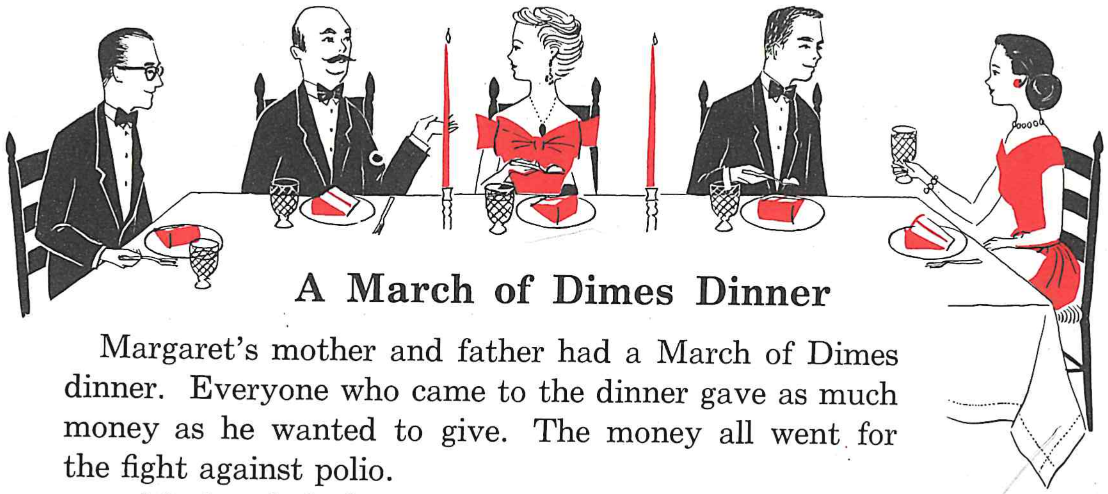
$\frac{5}{8}$
$+\frac{1}{8}$
$\frac{6}{8} = \frac{3}{4}$

9.



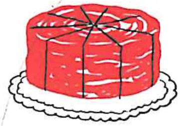
$\frac{2}{6}$
$+\frac{1}{6}$
$\frac{3}{6} = \frac{?}{2}$

Adding Like Fractions



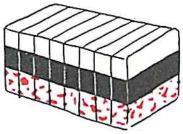
A March of Dimes Dinner

Margaret's mother and father had a March of Dimes dinner. Everyone who came to the dinner gave as much money as he wanted to give. The money all went for the fight against polio.



1. Mother baked a cake. She cut it into 9 equal pieces. Eight pieces were eaten. How many pieces were left? What fractional part of the cake was not eaten?

$$\frac{9}{9} - \frac{8}{9} = \frac{?}{9}$$

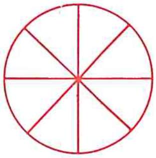


2. Mother cut a brick of ice cream into 8 equal parts. Each slice is what part of the whole? All but two slices were eaten. What part of the brick of ice cream was left?

$$\frac{8}{8} - \frac{6}{8} = \frac{2}{8} = \frac{?}{4}$$

3. The hot rolls were so good that only $\frac{1}{4}$ of a dozen were left on one plate and $\frac{1}{3}$ of a dozen on another plate. What part of a dozen rolls from each plate had been eaten?

$$\frac{4}{4} - \frac{1}{4} = \frac{?}{4} \qquad \frac{3}{3} - \frac{1}{3} = \frac{?}{3}$$



4. Use this drawing to subtract:

a. $\frac{5}{8} - \frac{1}{8} = \frac{?}{4}$ $\frac{4}{4}$

b. $\frac{7}{8} - \frac{3}{8} = \frac{?}{8}$

5. Subtract (make drawings if you need them):

a.	b.	c.	d.	e.
$\frac{7}{9}$	$\frac{5}{6}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{4}{5}$
$-\frac{2}{9}$	$-\frac{1}{6}$	$-\frac{3}{8}$	$-\frac{1}{4}$	$-\frac{2}{5}$
$\frac{9}{9}$	$\frac{4}{6}$	$\frac{8}{8}$	$\frac{4}{4}$	$\frac{2}{5}$

Making Cookies

Grace is making cookies for her Brownie group. This recipe makes 4 dozen cookies. Grace wants to make 16 dozen cookies so she will have enough to leave some at home. How many times must she multiply everything to get as many as she wants?

$$4 \text{ dozen}\,\overline{)\,16 \text{ dozen}} = 4.$$

She must have 4 times as many, or 4×4 dozen = 16 dozen.

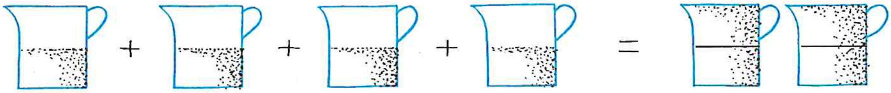
She must use 4 times each amount in the recipe.

SHREDDED WHEAT COOKIES

Beat: 4 egg whites
Add: $\frac{1}{2}$ cup sugar
$\frac{1}{4}$ tsp. salt
$\frac{3}{4}$ cup chopped walnuts
$\frac{1}{2}$ cup chopped dates
Roll: 4 large Shredded Wheat biscuits
Add: 1 tsp. vanilla

Drop on greased cookie sheet. Bake for $\frac{1}{2}$ hour in medium hot oven.

To find out how much sugar Grace will need, you could add the parts. You know that the 2 in each $\frac{1}{2}$ tells the size of the part, and the 1 tells how many parts.



$$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \quad ?$$

Adding the number of parts in use, $1 + 1 + 1 + 1 = 4$ parts of the half-cup ($\frac{1}{2}$) size, or $\frac{4}{2} = 2$. 4 halves = 2.

Now, instead of adding the fractions $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$, you could multiply. (You can always multiply when the parts are the same.) $4 \times \frac{1}{2} = \quad ?$ You can think, $4 \times 1 = 4$ of the halves, or $\frac{4}{2} = 2$. But if you write it, you have

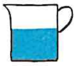
$$4 \times \frac{1}{2} = \frac{4 \times 1}{2} = \frac{4}{2} = 2$$

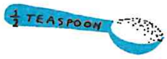
She must use 2 cups of sugar.

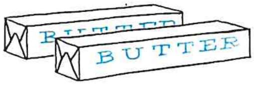
Multiplying a Fraction by a Whole Number

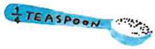
Practice Exercises

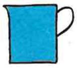
1. Double these things (multiply by 2):

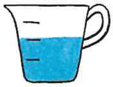
a. 

b. 

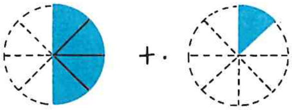
c. 

d. 

e. 

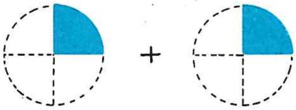
f. 

2. Add:



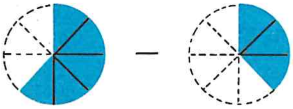
$$\begin{array}{r}\frac{4}{8}\\+\frac{1}{8}\\\hline\frac{?}{8}\end{array}$$

3. Add:



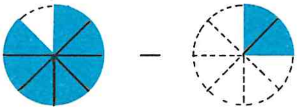
$$\begin{array}{r}\frac{1}{4}\\+\frac{1}{4}\\\hline\frac{?}{4}\end{array}$$

4. Subtract:



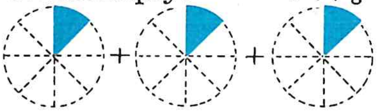
$$\begin{array}{r}\frac{5}{8}\\-\frac{3}{8}\\\hline\frac{?}{8}\end{array}$$

5. Subtract:

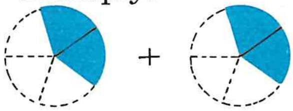


$$\begin{array}{r}\frac{7}{8}\\-\frac{2}{8}\\\hline\frac{?}{8}\end{array}$$

6. Multiply: $3 \times \frac{1}{8} = \frac{?}{8}$



Multiply: $2 \times \frac{2}{5} = \frac{?}{5}$



Draw pictures to find the answers to these:

8. Subtract:

$\frac{2}{3} - \frac{1}{3} = \ ?\frac{1}{3}$ $\quad \frac{6}{8} - \frac{1}{8} = \ ?\frac{5}{8}$ $\quad \frac{7}{8} - \frac{3}{8} = \ ?\frac{4}{8} = \frac{1}{2}$

9. Add:

$\frac{1}{5} + \frac{2}{5} = \ ?\frac{3}{5}$ $\quad \frac{4}{8} + \frac{1}{8} = \ ?\frac{5}{8}$ $\quad \frac{1}{4} + \frac{1}{4} = \ ?\frac{2}{4} = \frac{1}{2}$

10. Multiply:

$2 \times \frac{1}{9} = \ ?\frac{2}{9}$ $\quad 3 \times \frac{3}{10} = \ ?\frac{9}{10}$ $\quad 4 \times \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$

$\frac{2 \times 1}{9} = \frac{2}{9}$

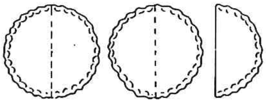
Unit Review

1. Which is more:

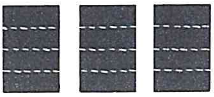
[✓ $\frac{1}{3}$ cup] or $\frac{1}{4}$ cup?

2. Which is less:

[✓ $\frac{1}{2}$ cup] or $\frac{1}{3}$ cup?



3. Write the mixed number that shows how much pie there is in the picture. How many halves are there ($\frac{1}{2}$)? 5 $\frac{4}{2}$ ②



4. Four boys share 3 chocolate bars equally. What part of 1 bar will each boy get? $\frac{1}{3}$

5. Where do you put the number in a fraction that tells how many parts you are using?

6. Study this chart, then answer the questions:

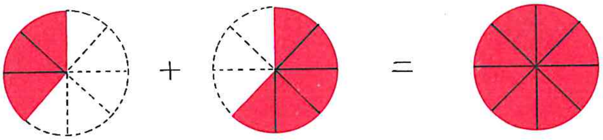
<table>
<tr><td colspan="8">1 whole</td></tr>
<tr><td colspan="4">$\frac{1}{2}$</td><td colspan="4">$\frac{1}{2}$</td></tr>
<tr><td colspan="2">$\frac{1}{4}$</td><td colspan="2">$\frac{1}{4}$</td><td colspan="2">$\frac{1}{4}$</td><td colspan="2">$\frac{1}{4}$</td></tr>
<tr><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td><td>$\frac{1}{8}$</td></tr>
</table>

a. How many $\frac{1}{2}$'s in a whole? 2
b. How many $\frac{1}{4}$'s in a whole? 4
c. How many $\frac{1}{8}$'s in a whole? 8
d. How many $\frac{1}{8}$'s in $\frac{1}{2}$ of a whole? 4

7. Add: $\frac{3}{8}$

$$\begin{array}{r} \frac{3}{8} \\ +\ \frac{5}{8} \\ \hline ? \end{array}$$

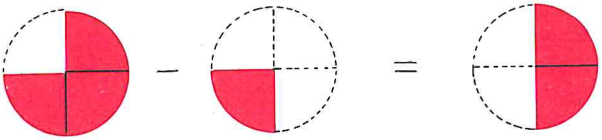
$\frac{8}{8}$



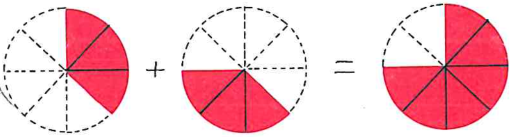
8. Subtract: $\frac{3}{4}$

$$\begin{array}{r} \frac{3}{4} \\ -\ \frac{1}{4} \\ \hline ? \end{array}$$

$\frac{2}{4}$

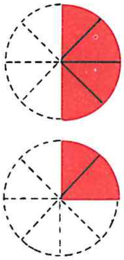


9. Multiply: $2 \times \frac{3}{8} =$? $\frac{6}{8}$ $\frac{3}{4}$



10. How many inches in $\frac{1}{2}$ of a yard? in $\frac{1}{4}$ of a yard?

Unit Test



1. What does the number under the line in a fraction tell you?

2. Tell which fraction is larger, $\frac{2}{8}$ or $\frac{1}{2}$.

3. Sue is making cookies. She needs $2 \times \frac{1}{3}$ cup of sugar. How much sugar should she use? Draw pictures of two $\frac{1}{3}$ cups of sugar. Then draw a picture of a cup with these parts together. How much do you have altogether?

4. Add $\frac{1}{2}$ of a pie and $\frac{1}{4}$ of a pie (draw pictures):

$$\frac{1}{2} + \frac{1}{4} = \quad ?$$

5. Subtract $\frac{3}{8}$ of a cake from a whole cake. How much is left? (Draw pictures.)

6. How many are $\frac{2}{3}$ of a dozen apples?

7. How much is $\frac{1}{2}$ of 32 in. of wire?

8. If you divide 2 apples equally among 3 children, what part of an apple does each child receive?

9. Show how you would divide a sheet of paper into fifths.

10. Which would you rather have, $\frac{1}{2}$ or $\frac{1}{4}$ of a pint of ice cream? Why?

11. Use the table in answering these questions:

a. $\frac{5}{8} + \frac{1}{8} = \quad ?$ 6/8

b. $\frac{5}{8} - \frac{1}{8} = \quad ?$ 4/8

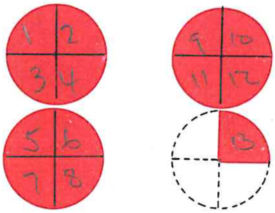
c. $3 \times \frac{1}{4} = \quad ?$ 3/4

d. Why does $\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$?

(Make a drawing to help you.)

1 whole							
$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

12. Why do we call $3\frac{1}{4}$ a mixed number? How many fourths are there in $3\frac{1}{4}$? $(3 + \frac{1}{4} = \frac{?}{4} + \frac{1}{4} = \frac{?}{4})$



UNIT 9

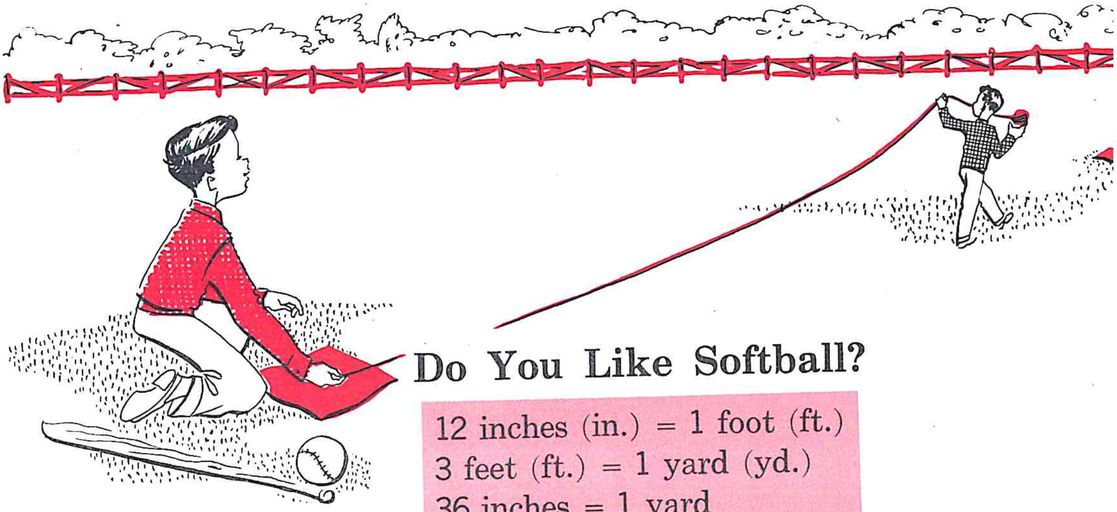
Measurements in Your Work and Play

No one had to explain to Jack what it means to say, "All work and no play makes Jack a dull boy." If there is anything Jack likes, it is games. He works hard, but he plays hard, too. Ann likes games just as well as Jack does. Everyone works better if he spends some time playing.

Spring is the time for softball, hopscotch, jumping rope, and all the other games that are so much fun. Spring is the time when you play hard, and get so hungry you could "eat a bear."

Jack is going to make a softball field. He is going to help Ann make a new hopscotch diagram. Ann said she would paint a new sign for the clubhouse.

1. What must Jack know about numbers before he can make a softball field?
2. What measurements will Jack and Ann use for the hopscotch diagram?
3. Did you ever make a sign, or help make a clubhouse? Tell how you used numbers in measuring.
4. Kim knows that anyone in sports has to be in bed early in the evening. See how many different things you can tell about time from what you already know about it.
5. If you know the length of Tom's and Fred's kite strings, how can you find whose string is the longer?
6. You know Jack's and Jerry's weights. If someone asks you to tell how much more one weighs than the other, how would you find the answer?
7. Have you ever been in a relay race in a track meet? How were numbers used? Was a stop watch used?
8. How many inches are there in a foot? in a yard?
9. Kim says that he can jump a distance of 10 ft. Do you believe that he can?

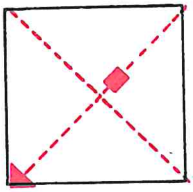


Do You Like Softball?

12 inches (in.) = 1 foot (ft.)
3 feet (ft.) = 1 yard (yd.)
36 inches = 1 yard

1. The boys are making a softball diamond which will measure 45 feet between bases. How many feet must they measure for all four sides?

2. Jack knows it will be easier to make the sides straight if he uses a ball of heavy cord. The ball of cord he sees in the dime store has 21 yards in it. Will Jack have enough cord to measure one side at a time?



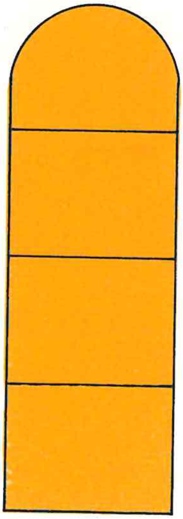
3. The boys measure from home base to second base and from first base to third base. If the lines are equal in length do you think they will have a square? Each line should be about 64 feet long. How much farther must the catcher "peg" to second base than to first base?

4. Look at the picture of the softball diamond. Do you see the pitcher's mound? It is 35 feet from home base. How many feet is the mound from second base?

5. Add (always think first — will the answer be 10 or more? 20 or more?):

6 ft.	8 in.	9 yd.	5 mi.	9 yd.	8 in.	9 yd.
7 ft.	6 in.	7 yd.	6 mi.	1 yd.	4 in.	8 yd.
48 ft.	5 in.	3 yd.	9 mi.	7 yd.	5 in.	9 yd.

Making a Hopscotch Diagram



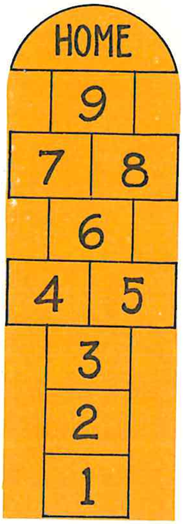
Jack and Ann are making a hopscotch diagram. Their father said they could make one on the cement in front of the garage.

1. The hopscotch diagram is to be 9 feet long. How many yards is this? How many inches?

2. The hopscotch diagram is one-third as wide as it is long. How many feet wide is it?

3. Jack and Ann are going to divide the length into four equal parts. How long will each part be?

4. They painted the lines, and Ann is going to make the numbers 8 inches high. Jack thought it would be good to have the numbers half that wide. How wide would she make them?



5. Jack and Ann have fun using the hopscotch diagram now that it is made. Ann can jump $\frac{2}{3}$ of the distance from one end to the other in the diagram. How far can she jump?

6. Finish these sentences:

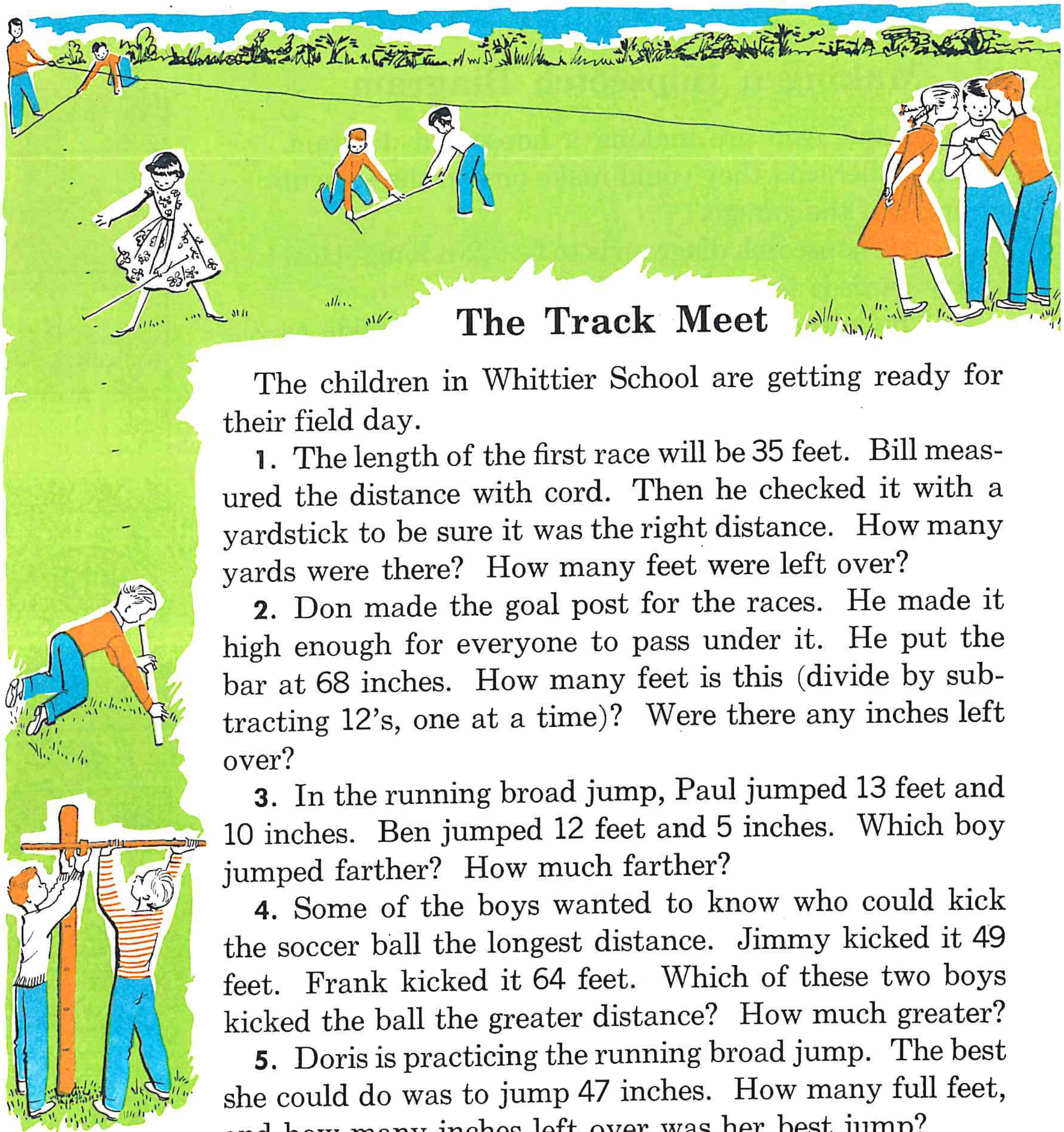
a. 3 feet = ? inches.
c. 36 inches = ? feet.
e. 7 feet = ? inches.
b. 6 feet = ? yards.
d. 14 yards = ? feet.
f. 64 inches = ? feet.

7. Divide (always think first — about how much will the answer be?):

a.	**b.**	**c.**	**d.**	**e.**	
8)64 ft.	6)72 in.	4)84 in.	7)84 ft.	9)63 yd.	5)45 yd.

8. Multiply (first think — about how many tens should I get?):

12 ft.	12 yd.	19 in.	27 in.
×6	×8	×3	×3



The Track Meet

The children in Whittier School are getting ready for their field day.

1. The length of the first race will be 35 feet. Bill measured the distance with cord. Then he checked it with a yardstick to be sure it was the right distance. How many yards were there? How many feet were left over?

2. Don made the goal post for the races. He made it high enough for everyone to pass under it. He put the bar at 68 inches. How many feet is this (divide by subtracting 12's, one at a time)? Were there any inches left over?

3. In the running broad jump, Paul jumped 13 feet and 10 inches. Ben jumped 12 feet and 5 inches. Which boy jumped farther? How much farther?

4. Some of the boys wanted to know who could kick the soccer ball the longest distance. Jimmy kicked it 49 feet. Frank kicked it 64 feet. Which of these two boys kicked the ball the greater distance? How much greater?

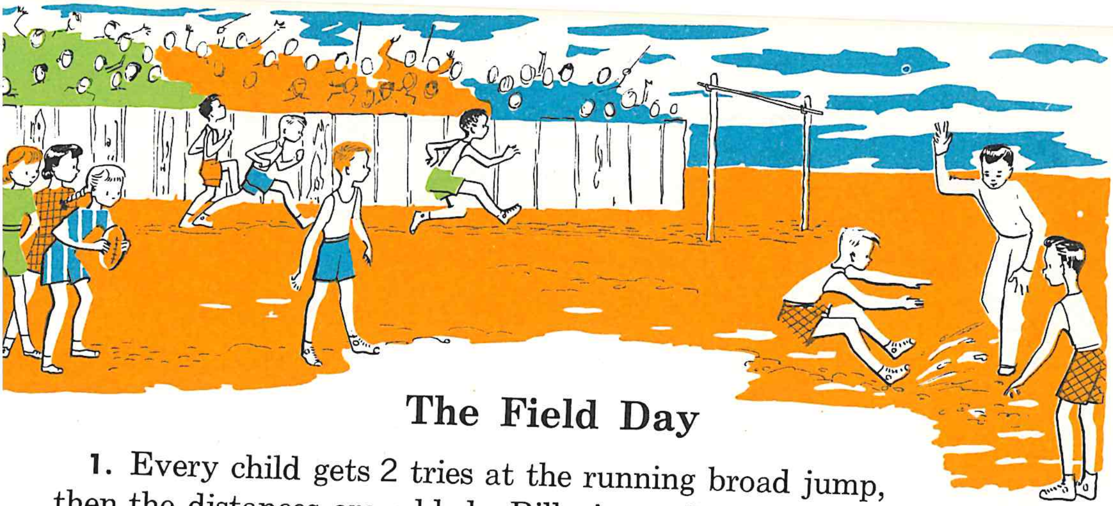
5. Doris is practicing the running broad jump. The best she could do was to jump 47 inches. How many full feet, and how many inches left over was her best jump?

6. Add:

36 ft.	72 yd.	50 in.
15 ft.	8 yd.	9 in.
18 ft.	12 yd.	16 in.

7. Subtract:

80 ft.	76 yd.	44 in.
– 54 ft.	– 38 yd.	– 38 in.



The Field Day

1. Every child gets 2 tries at the running broad jump, then the distances are added. Billy jumped 3 feet and 8 inches the first time and 3 feet and 3 inches the next time. What total distance did he jump in two tries?

3 ft. and 8 in.
+ 3 ft and 3 in.

2. Add:

a.
6 ft. and 4 in.
+ 3 ft. and 5 in.

b.
2 ft. and 7 in.
+ 3 ft. and 4 in.

c.
1 ft. and 8 in.
+ 3 in.

3. A boy from Whittier School won the standing broad jump with a distance of 4 feet and 11 inches. A boy from Stone School won second place. His jump was 3 feet and 10 inches long. How much farther did the boy from Whittier School jump than the boy from Stone School?

4 ft. and 11 in.
− 3 ft. and 10 in.

4. A girl from Jay School won the soccer-ball kick with a distance of 23 feet and 4 inches. A girl from Whittier School won second place by kicking the ball 22 feet and 2 inches. How much farther did the girl from Jay School kick the ball than the girl from Whittier School?

5. Subtract:

5 ft. and 9 in.
− 2 ft. and 4 in.

13 ft. and 11 in.
− 11 ft. and 6 in.

11 ft. and 10 in.
− 5 ft. and 4 in.

Adding and Subtracting Measurements — Feet and Inches

Team Scores in Standing Jump

The boys and girls decided to have teams in the standing broad jump. Each team was to have three members. The score for a team was to be found by adding the distances that each of the three children jumped.

Team A	
John S.	3 ft. and 3 in.
Sam P.	2 ft. and 4 in.
Dan W.	2 ft. and 8 in.
	7 ft. and 15 in.

We add the inches first. 3 in. + 4 in. + 8 in. = 15 in. Add the feet next. 3 ft. + 2 ft. + 2 ft. = 7 ft. We get 7 ft. and 15 in.

You do not want to leave the answer like this. You will see right away that 15 in. = 1 ft. (12 in.) and 3 in. left over. You will add the 1 ft. that you get from the 15 in. to the feet you have. You could have held the 1 ft. from the 15 in. when you were adding, couldn't you? Your answer is 8 ft. and 3 in.

Before you find the rest of the scores, change these inches to feet and inches.

a. 19 in.
b. 13 in.
c. 15 in.
d. 18 in.
e. 14 in.
f. 17 in.

As you do these additions, hold the number of feet that you get when adding inches:

Team B	
Ray B.	2 ft. and 11 in.
Tod K.	2 ft. and 5 in.
Pete M.	2 ft. and 7 in.

Team C	
Sue T.	2 ft. and 2 in.
May F.	2 ft. and 5 in.
Dot N.	2 ft. and 6 in.

Team D	
Kate R.	2 ft. and 1 in.
Nick R.	3 ft. and 2 in.
Joe A.	2 ft. and 11 in.

Team E	
Ray T.	3 ft. and 4 in.
Sally M.	2 ft. and 3 in.
Irene O.	2 ft. and 5 in.

Subtracting Measurements

1. Harry threw the ball 44 feet and 9 inches in the morning. He threw it a distance of 33 feet and 6 inches in the afternoon. How much farther did he throw it in the morning than in the afternoon?

44 ft. and 9 in.
– 33 ft. and 6 in.

Subtract the inches first.

2. Steven and John want to see which one can kick the ball the greater distance. Steven kicked it 41 feet and 2 inches and John kicked it 39 feet and 11 inches. How much greater was Steven's distance?

41 ft. and 2 in.
– 39 ft. and 11 in.

Can we take 11 inches from 2 inches? What must we do?

41 ft. and 2 in. = 40 ft. and 14 in.
– 39 ft. and 11 in. = – 39 ft. and 11 in.

Why?

What is the answer?

Remember: When you don't have enough inches to subtract, you use a foot to give you more inches. Instead of having 10 as you do when you use a ten in subtracting regular numbers, you must remember that you have 12 because there are 12 inches in a foot. You add this 12 to any inches you may have already.

3. These are the scores of the boys in the broad jump. Find how much farther one boy jumped than the other boy:

Tony's score: 5 ft. and 8 in.
Mark's score: 5 ft. and 3 in.

Henry's score: 6 ft. and 3 in.
Jim's score: 5 ft. and 8 in.

Bill's score: 6 ft. and 7 in.
Joe's score: 6 ft. and 5 in.

Billy's score: 5 ft. and 2 in.
John's score: 4 ft. and 9 in.

Broad Jump

Tim could only jump 2 ft. and 9 in. when he first tried the broad jump. Now he can jump three times that far. How far can he jump now?

$$\begin{array}{r} \text{2 ft. and 9 in.} \\ \times 3 \\ \hline \text{6 ft. and 27 in.} \\ \text{or} \\ \text{8 ft. and 3 in.} \end{array}$$

Multiply the inches. 3 × 9 in. = 27 in. 1 ft. = 12 in. How many feet are there in 27 in.? How many inches are left?

Multiply the feet. 3 × 2 ft. = 6 ft. Add the feet you have from 27 in. to the 6 ft. You have how many feet?

Tim can jump 8 ft. and 3 in.

Multiply:

$$\begin{array}{r} \text{1 ft. and 3 in.} \\ \times 6 \\ \hline \end{array} \qquad \begin{array}{r} \text{2 ft. and 4 in.} \\ \times 5 \\ \hline \end{array} \qquad \begin{array}{r} \text{6 ft. and 2 in.} \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{4 ft. and 6 in.} \\ \times 7 \\ \hline \end{array} \qquad \begin{array}{r} \text{1 ft. and 8 in.} \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} \text{4 ft. and 9 in.} \\ \times 2 \\ \hline \end{array}$$

Change to feet and inches:

1 ft., 16 in.
2 ft., 15 in.
18 in.
27 in.
12 ft., 19 in.
4 ft., 13 in.
14 in.
34 in.

Multiply 9 yd. and 2 ft. by 3:

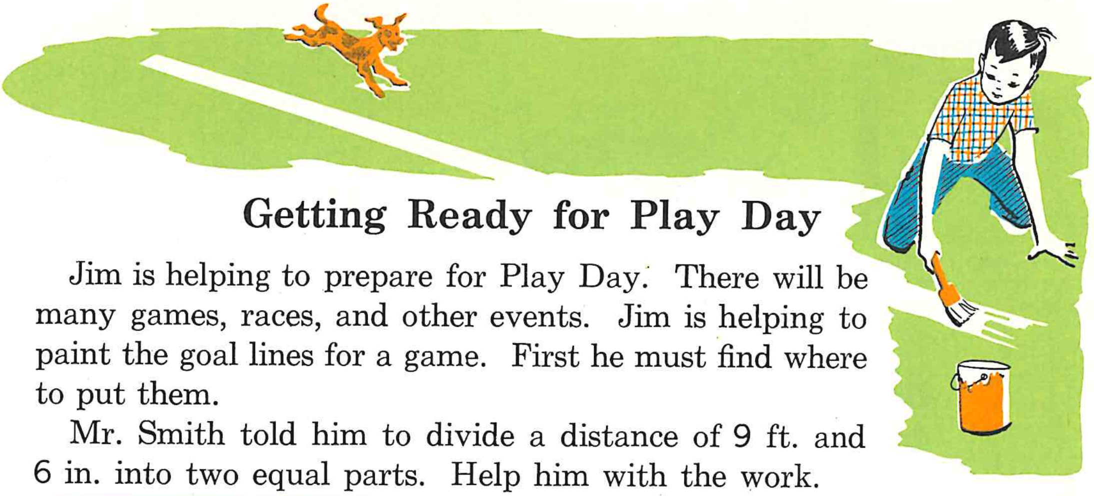
$$\begin{array}{r} \text{9 yd. and 2 ft.} \\ \times 3 \\ \hline \text{27 yd. and 6 ft.} \\ \text{or} \\ \text{29 yd.} \end{array}$$

Multiply the feet. 3 × 2 ft. = 6 ft. 6 ft. are how many yards? (Use a yardstick to prove this.)

Multiply the yards. 3 × 9 yd. = 27 yd. Add the 2 yards you get from 6 ft. to the 27 yd.

Multiply:

$$\begin{array}{r} \text{5 yd. and 3 ft.} \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} \text{3 yd. and 1 ft.} \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} \text{6 yd. and 2 ft.} \\ \times 4 \\ \hline \end{array}$$



Getting Ready for Play Day

Jim is helping to prepare for Play Day. There will be many games, races, and other events. Jim is helping to paint the goal lines for a game. First he must find where to put them.

Mr. Smith told him to divide a distance of 9 ft. and 6 in. into two equal parts. Help him with the work.

$$\begin{array}{r} 4\text{ ft. and }\ 9\text{ in.} \\ 2\overline{)9\text{ ft. and }\ 6\text{ in.}} \\ \underline{8\text{ ft.}}\qquad\qquad\quad \\ 1\text{ ft. and }\ 6\text{ in.} \\ \text{or}\quad 18\text{ in.} \\ \underline{18\text{ in.}} \end{array}$$

Divide 9 ft. into two equal parts. You have 4 ft. on each side with one foot left. Why?

1 ft. and 6 in. = ? inches.

Divide 18 inches into two equal parts and you will have 9 inches in each part.

Divide:

$3\overline{)9\text{ ft. and }3\text{ in.}}$ $2\overline{)8\text{ ft. and }4\text{ in.}}$ $4\overline{)5\text{ ft. and }8\text{ in.}}$

$4\overline{)6\text{ ft. and }8\text{ in.}}$ $2\overline{)3\text{ ft. and }2\text{ in.}}$ $6\overline{)7\text{ ft. and }6\text{ in.}}$

Change to inches:

1 ft., 4 in. 3 ft., 8 in. 2 ft., 7 in. 3 ft., 1 in.

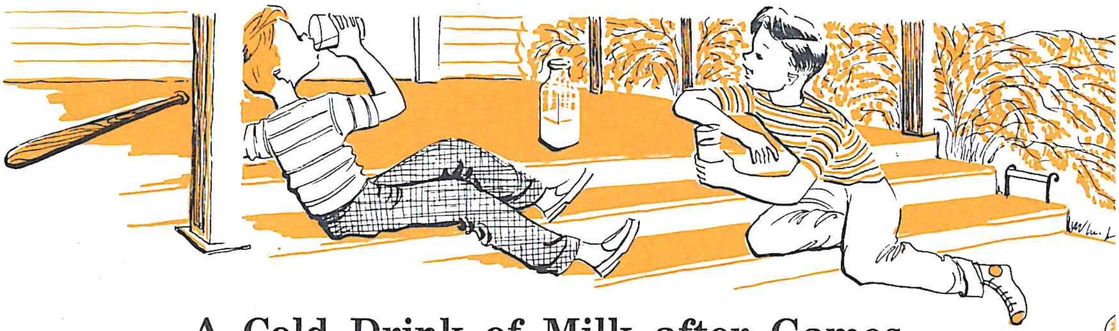
Change to mixed numbers in feet:

27 in. = $2\frac{1}{4}$ ft. 18 in. = ? 30 in. = ? 16 in. = ? 21 in. = ?

Finish these problems:

$$\begin{array}{r} ?\qquad\quad ?\quad \\ 4\overline{)8\text{ ft. and }8\text{ in.}} \end{array} \qquad\qquad \begin{array}{r} ?\qquad\quad ?\quad \\ 3\overline{)6\text{ ft. and }9\text{ in.}} \end{array}$$

Dividing Distances

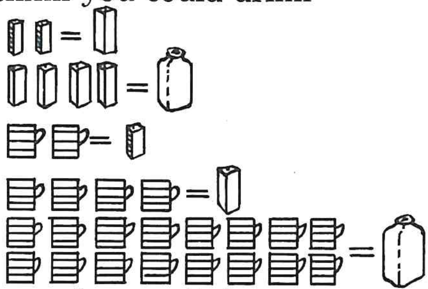


A Cold Drink of Milk after Games

"I could drink a gallon of milk right now," Tony told Billy on the way home from school. It was a warm spring day and the boys had played ball every minute after school.

Look at this table and see if you think you could drink a gallon of milk at one time:

2 pints (pt.) = 1 quart (qt.)
4 quarts (qt.) = 1 gallon (gal.)
2 cups = 1 pint (pt.)
4 cups = 1 quart (qt.)
16 cups = 1 gallon (gal.)



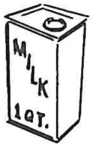
1. Fill a pint bottle full of water, and pour it into a quart bottle. See how many it takes to make 1 quart.

2. Pour 4 quarts of water into a gallon jar and see if 4 quarts make a gallon. Do you think you could drink a gallon of milk right now?

3. Use a measuring cup to fill 1 pt. How many cups did it take to fill 1 pt.? Can you tell how many cups there are in 1 qt.?

4. Tony and Billy each drank 3 glasses of milk. If the glasses held 1 cup, how many quarts did they drink in all?

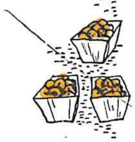
5. Marion and Betty found this carton of milk in the refrigerator. How many glasses, each holding 1 measuring cup, could each of them have if they divided it equally?



6. Why is 1 quart equal to $\frac{1}{4}$ of a gallon?

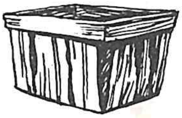
7. What part of a gallon is a pint?

Spring Vegetables

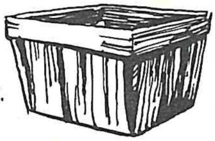


Charles is the best pitcher in the Oaks Ball Club, but he cannot play after school. Charles lives on a truck farm $\frac{1}{2}$ mile from town. He has lots of work to do since spring is here. The boys decided to help him do some of his work so he could practice ball for a little while after school.

Here are some facts the boys must know to help with the problems:



1 pt.



1 qt.

2 pints (pt.) = 1 quart (qt.)
8 quarts = 1 peck (pk.)
4 pecks = 1 bushel (bu.)

1 pk.

1 bu.

1. The strawberries are ready to pick. Tony and David are helping Charles pick them. They use small boxes so that the strawberries will not get crushed. The 3 boys filled 12 pt. boxes after school. How many quarts did they pick?

2. Charles' father got quart boxes for the boys to use so they would not have to change them as often as they did with the pint boxes. The boys filled 9 quarts one afternoon. How many pints are there in 9 quarts?

3. The boys are helping Charles plant potatoes. They filled a canvas bag that held a peck of potato pieces. How many pecks can they get from 2 bushels of potato pieces?

Dry Measures

Making Punch

Sharon and Ted made some punch. This is the recipe that they used:

RASPBERRY COOLER

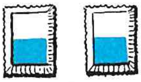
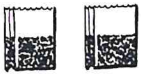
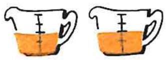
$\frac{1}{2}$ package raspberry powder
$\frac{1}{2}$ package grape powder
$\frac{3}{4}$ cup sugar
4 cups water
$\frac{1}{2}$ cup orange juice
$\frac{1}{4}$ cup lemon juice
$\frac{1}{2}$ cup crushed pineapple

Mix powder and sugar in water. Add fruit juices and pineapple. Chill. Makes $2\frac{1}{2}$ quarts.

1. Sharon and Ted wanted to make twice this amount. How many quarts would they have if they doubled this recipe?

2. How many glasses, holding 1 cup each, would they have if they made 5 quarts?

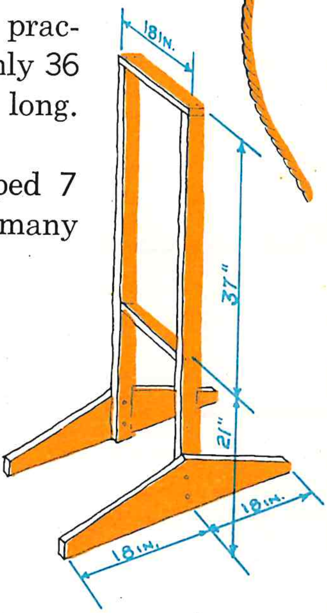
3. They are going to use just twice the amount of everything so they will have enough. Let's help them find the amounts to use:

	raspberry powder	$2 \times \frac{1}{2}$ pkg. = 1 ? pkg.
	grape powder	$2 \times \frac{1}{2}$ pkg. = 1 ? pkg.
	sugar	$2 \times \frac{3}{4}$ cup = $\frac{6}{4}$? cups
	water	2×4 cups = ? cups
	orange juice	$2 \times \frac{1}{2}$ cup = 1 ? cups
	lemon juice	$2 \times \frac{1}{4}$ cup = 1/2 ? cups
	crushed pineapple	$2 \times \frac{1}{2}$ cup = ? cups

Exercises That Help Us

1. Ann knows she would be better at hopscotch if she could jump farther and keep her balance. She is practicing giant steps. At first she could take a step only 36 inches long. Now she can take a step 42 inches long. How many inches farther can she step now?

2. Ann is practicing hopping. At first she hopped 7 inches on 1 foot. Now she can hop 22 inches. How many inches farther can she hop now?



3. Jimmy is practicing throwing a ball. He has made a pitching frame from old wood. How high is it? How many feet and inches?

4. How long is the base in feet? in yards?

5. Jimmy is making his legs strong by doing the duck walk. At first he could go only 12 ft. Now he can walk to the 14 ft. 6 in. mark. How much farther can he duck walk now?

6. Jimmy is making his arms strong by climbing a rope. He could climb 9 ft. 6 in. last week. Now he can climb 12 ft. 3 in. How much higher can he climb now?

7. Jimmy is trying to chin himself. He keeps his legs straight. At first he could get only 7 inches off the ground. Now he can pull himself 1 ft. 3 in. off the ground. How much farther can he pull himself now?

Problems with Measures

How Well Have You Learned?

1. Fill in the blanks:

a. ? pints = 1 quart
b. ? quarts = 1 gallon
c. ? inches = 1 foot
d. ? cups = 1 pint
e. ? inches = 1 yard
f. ? pecks = 1 bushel
g. ? cups = 1 quart
h. ? cups = 1 gallon
i. ? quarts = 1 peck
j. 1 yard = ? inches

2. Add:

a.	**b.**	**c.**
4 feet and 8 inches	2 yards and 1 foot	5 feet and 6 inches
3 feet and 2 inches	3 yards and 1 foot	2 feet and 8 inches

3. Subtract:

6 feet and 6 inches	7 feet and 1 inch	6 yards and 1 foot
5 feet and 9 inches	4 feet and 10 inches	3 yards and 2 feet

4. Use twice the amount of everything in this recipe:

PINK MINT TAFFY

2 cups sugar
$\frac{1}{2}$ cup light corn sirup
2 drops red food coloring
$\frac{1}{4}$ teaspoon oil of peppermint
$\frac{2}{3}$ cup water

5. Find these amounts:

a. 8 pints = ? quarts
b. 2 quarts = ? cups
c. 24 inches = ? feet
d. 9 yards = ? inches

6. There are 24 children in Paul's room at school. He is bringing enough punch so everyone will have a glass. If each glass holds 1 cup, how many gallons will he need?

7. Clara's mother asked her to bring 4 pt. of home-canned cherries from the basement. Clara could find only quart cans of cherries. How many quarts should she bring to make this amount?

Practice with Measures

16 ounces (oz.) = 1 pound (lb.)

Jeff doesn't like spinach. If it and other vegetables help to make him a better ballplayer, he will eat them! Jeff's mother was very surprised when he asked if he could have spinach for dinner.

1. Jeff went to the store to buy a can of spinach for dinner. He found 1 can that said: NET WEIGHT 14 ounces. Another one said: NET WEIGHT 16 ounces. Jeff took the 14 ounce can. How much less than a pound was it?

2. Jeff bought a loaf of bread that weighed 20 ounces. Find how much more than a pound it weighed.

3. Mother told Jeff to buy $\frac{1}{2}$ pound of fresh peas. He weighed them on the scale to make sure he got ? ounces.

4. Jeff bought $\frac{1}{4}$ lb. of fresh cherries with his own money. He had only enough money for that amount, so he measured carefully to be sure he had only ? ounces.

5. Jeff's mother told him to get 3 pt. boxes of strawberries. There was only one pint box but there were many quart boxes left. What do you think Jeff should do?

6. Find these amounts:

a. $\frac{1}{4}$ of a foot = ? inches **b.** $\frac{1}{8}$ of a pound = ? ounces

7. Add:

6 ft. and 2 in.	3 gal. and 3 qt.	4 lb. and 10 oz.
1 ft. and 3 in.	2 gal. and 2 qt.	5 lb. and 9 oz.

8. Subtract:

7 ft. and 9 in.	5 gal. and 2 qt.	6 lb. and 10 oz.
6 ft. and 2 in.	2 gal. and 3 qt.	4 lb. and 14 oz.

At the Store

If there is anything Tony and Carol like, it is meat! They like hotdogs and hamburgers the best, but any kind of meat is good.

1. Draw a picture of everything Carol bought at the meat market: $\frac{1}{4}$ lb. of butter, $\frac{3}{4}$ lb. of ground beef, $\frac{1}{4}$ lb. of liver.

Butter was 76¢ a pound, ground beef was 60¢ a pound, liver was 88¢ a pound. Find how much change Carol should receive from a half-dollar, a quarter, and 2 dimes.

2. Tony bought these things for his mother: $\frac{1}{4}$ lb. of dried beef, $\frac{1}{2}$ lb. of cheese, 1 lb. of lamb stew meat.

Dried beef was 64¢ a pound, cheese was 80¢ a pound, lamb stew was 36¢ a pound. How much change should Tony receive from a half-dollar, a quarter, and 4 nickels?

3. Tony talked his mother into having hotdogs for dinner. There are 6 in the family and each of them will eat 2. If hotdogs cost 6¢ each, how much money will Tony need to buy enough for dinner?

4. Mike heard the butcher tell a lady that the pork chop she bought was 21¢. Mike bought 3 pork chops and $\frac{1}{4}$ of a pound of pork sausage at 72¢ a pound. Will 75¢ be enough to pay for the meat? If not, how much more money will he need?

5. What will a pound of cheese cost if the $\frac{1}{4}$ lb. packages sell at 24¢ each?

6. How many cups are there in 1 gallon?

7. How many cups are there in 1 quart?

8. How many ounces are there in $\frac{3}{4}$ lb.?

9. How many inches are there in one and one-half yards?

10. 6 quarts = ? gallons. **11.** 2 gallons = ? quarts.

12. 5 gallons = ? quarts.

Reviews — Measurements

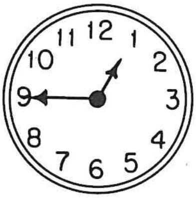
Parts of an Hour

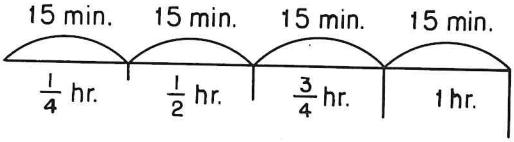
60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours (hr.) = 1 day

7 days (da.) = 1 week
52 weeks (wk.) = 1 year
12 months (mo.) = 1 year

Richard and Catherine know how important a minute is. It can mean losing or winning a ball game, or being late to school.

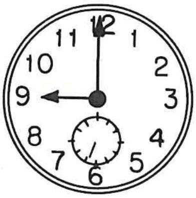
Do you remember when you studied quarter hours? How long is a quarter hour?

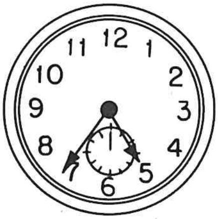


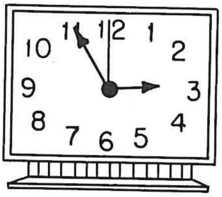

15 min.
15 min.
15 min.
15 min.
$\frac{1}{4}$ hr.
$\frac{1}{2}$ hr.
$\frac{3}{4}$ hr.
1 hr.

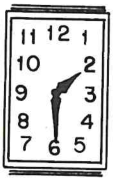
What time does the watch tell? What is another way to say it? Give two ways to read the time on the clock.

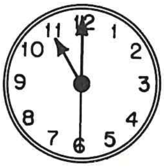
How many seconds in a minute? Tell what time it is on each of these watches and clocks.











1. It is 17 min. after 8 o'clock. How many minutes is it until 9 o'clock?

2. How many seconds are there in 5 minutes?

3. 1 min. = 60? sec. 3 wk. = 21? da. $\frac{1}{2}$ min. = 30? sec.
4. 4 wk. = 31? da. $\frac{1}{2}$ hr. = ? min. 2 yr. = 24? mo.
5. $\frac{1}{4}$ da. = ? hr. $\frac{1}{2}$ yr. = ? wk. $\frac{3}{4}$ hr. = ? min.

Learning More about Time

Janet is going to bake cookies and then bake a cake. It will take 70 minutes to bake the cookies and 1 hr. and 5 min. for the cake.

She would like to know how long she will be using the oven so her older sister can then put in a roast for dinner. She should add. Why?

$$\begin{array}{r} 70 \text{ min.} \\ +\ 1 \text{ hr. and } 5 \text{ min.} \\ \hline 1 \text{ hr. and } 75 \text{ min.} \\ \text{or} \\ ? \text{ and } ? \end{array}$$

Add the minutes and you will see that you have 75 minutes.

60 minutes = 1 hour.

75 minutes = 1 hour and 15 minutes. Why?

Add:

$$\begin{array}{r} 2 \text{ hr. and } 45 \text{ min.} \\ 1 \text{ hr. and } 15 \text{ min.} \\ \hline \end{array} \qquad \begin{array}{r} 1 \text{ hr. and } 15 \text{ min.} \\ 2 \text{ hr. and } 50 \text{ min.} \\ \hline \end{array} \qquad \begin{array}{r} 3 \text{ hr. and } 50 \text{ min.} \\ 1 \text{ hr. and } 15 \text{ min.} \\ \hline \end{array}$$

Finish subtracting:

$$\begin{array}{r} \overset{1}{\cancel{2}} \text{ hr. and } \overset{75}{\cancel{15}} \text{ min.} \\ -\ 1 \text{ hr. and } 25 \text{ min.} \\ \hline \end{array} \qquad \begin{array}{r} \overset{2}{\cancel{3}} \text{ hr. and } \overset{70}{\cancel{10}} \text{ min.} \\ -\ 1 \text{ hr. and } 30 \text{ min.} \\ \hline \end{array} \qquad \begin{array}{r} 8 \text{ hr. and } 12 \text{ min.} \\ -\ 2 \text{ hr. and } 40 \text{ min.} \\ \hline \end{array}$$

Multiply:

$$\begin{array}{r} 1 \text{ hour and } 20 \text{ minutes} \\ \times 5 \\ \hline 5 \text{ hours and } 100 \text{ minutes} \\ \text{or} \\ ? \text{ and } ? \end{array}$$

Multiply the minutes and you have 100 minutes. 60 minutes = 1 hr. 100 minutes = 1 hour and ? minutes.

$$\begin{array}{r} 1 \text{ hr. } 40 \text{ min.} \\ \times 2 \\ \hline \end{array} \qquad \begin{array}{r} 2 \text{ hr. and } 15 \text{ min.} \\ \times 4 \\ \hline \end{array} \qquad \begin{array}{r} 3 \text{ hr. and } 50 \text{ min.} \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{l} \quad 1 \text{ hr. and } \quad ? \\ 7\overline{)8 \text{ hr. and } 3 \text{ min.}} \\ \quad \underline{7} \end{array} = ? \qquad \begin{array}{l} \quad 1 \text{ hr. and } \quad ? \\ 8\overline{)9 \text{ hr. and } 4 \text{ min.}} \\ \quad \underline{?} \end{array} = ?$$

Do You Know?

1. The pans of cookies will take 1 hour and 15 minutes; the cake and pans of rolls will take 1 hour and 50 minutes. Mrs. Toll wants to know how long she must keep the oven on. Why must you add?

$$\boxed{\begin{array}{r} 1 \text{ hr. and } 15 \text{ min.} \\ +\,1 \text{ hr. and } 50 \text{ min.} \\ \hline ? \quad \text{and} \quad ? \end{array}}$$

When you add the minutes, will you get 1 hour that must be held and added with the other hours? Why?

2. Max's father flew from his home to New York City in 6 hours and 15 minutes. Today a jet plane made the trip in 3 hours and 20 minutes. How much less time did it take the jet plane to make the trip?

$$\boxed{\begin{array}{r} 6 \text{ hr. and } 15 \text{ min.} \\ -\,3 \text{ hr. and } 20 \text{ min.} \\ \hline ? \quad \text{and} \quad ? \end{array}}$$

Why will you need more minutes in order to do the subtraction? Where will you get more minutes?

How many hours and how many minutes will you have after using an hour to give you more minutes?

3. Multiply:

$$\begin{array}{r} 2 \text{ hr. and } 35 \text{ min.} \\ \times 2 \\ \hline ? \quad \text{and} \quad ? \end{array}$$

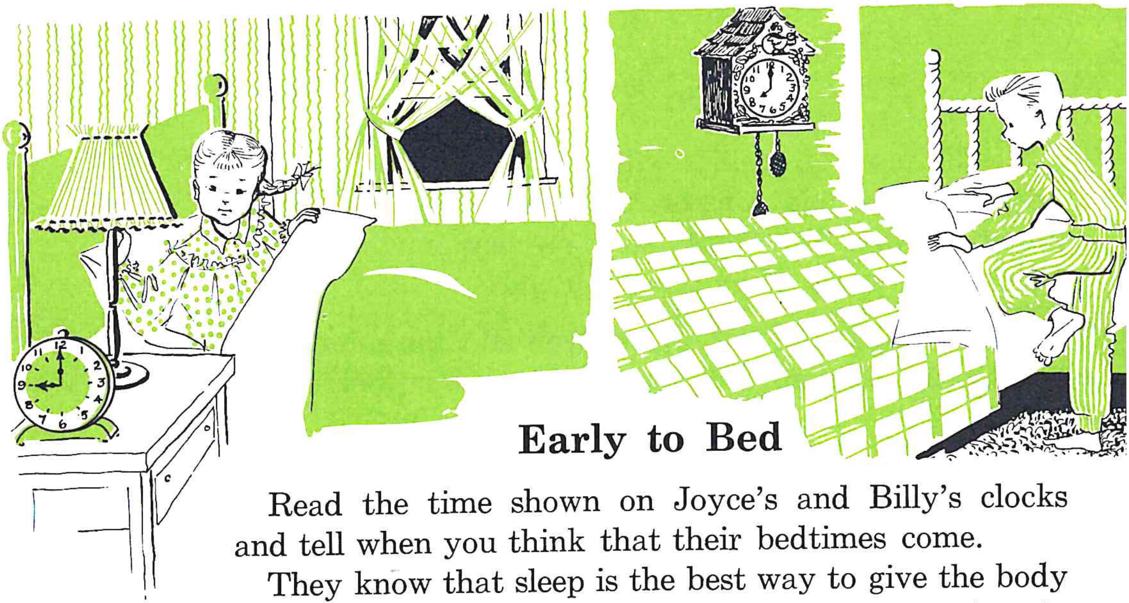
Tell why you will be holding 1 hour after finding the number of minutes.

4. Divide:

$$\begin{array}{r} ? \quad \text{and} \quad ? \\ 4\overline{)9 \text{ hr. and } 24 \text{ min.}} \end{array}$$

How many hours will you use? How many hours are left? 1 hour and 24 min. = ? minutes.

5. 3 hr. and 18 min. + 5 hr. and 45 min. = ?.
6. 4 hr. and 32 min. − 2 hr. and 54 min. = ?.
7. 3 × 2 hr. and 36 min. = ?.
8. 15 hr. and 24 min. ÷ 6 = ?.



Early to Bed

Read the time shown on Joyce's and Billy's clocks and tell when you think that their bedtimes come.

They know that sleep is the best way to give the body a chance to repair the wear and tear that takes place in the daytime. They both want to be good in games. Then, too, if they stay up late, everything seems to go wrong the next day.

1. If Billy goes to bed at 8 P.M. and gets up at 7 A.M., how many hours has he been in bed?

2. Joyce is 10 years old and she gets 10 hours of sleep each night. What time will she get up if she goes to bed at 9 P.M.?

3. Father said, "It is a quarter-past 6 o'clock. How many minutes until half-past 6 o'clock? until 20 min. to 7 o'clock?

4. Add:

3 hr. and 36 min.
5 hr. and 40 min.

5. Subtract:

8 hr. and 24 min.
5 hr. and 38 min.

6. Multiply:

2 hr. and 16 min.
× 4

7. Divide:

3)4 hr. and 12 min.

Days, Weeks, Months

Some of the nicest times children have are those that are spent with their parents. There are so many things that you can do with your family in the summer when you are on vacation.

1. Mr. Jones gets 1 week of vacation in June and another week in December. How many weeks out of the year does he work?

2. Sam Brown is 48 years old. What was his age on his birthday before the last one?

3. How many days are there in 14 weeks?

4. John will be in a yoyo contest in 2 weeks. How many days before the contest?

5. How many weeks are left if this year is half over?

6. How many months are left in this year if 4 months have passed?

7. At 6 o'clock in the evening, is it 6 P.M. or 6 A.M.?

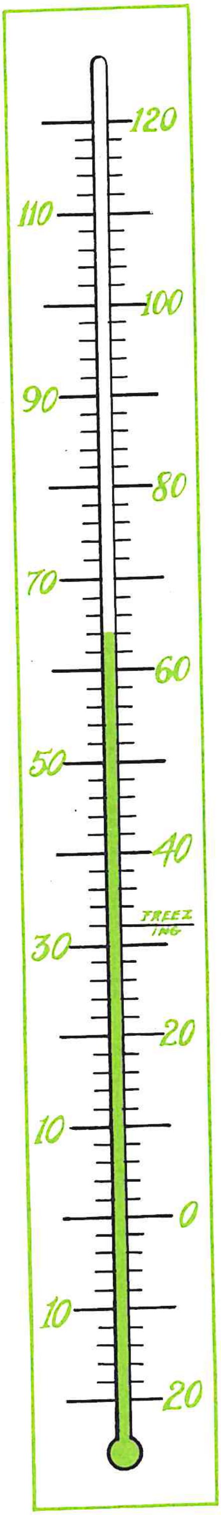
8. Roger's birthday was 2 months ago. How many months before he has another birthday?

9. Complete these sentences:

21 days = ? weeks.
3 days = ? hours.
$\frac{1}{3}$ year = ? months.
3 years = ? months.

10. What part of a year is 1 month?

11. Which month has exactly 4 weeks? When does it have one day more than 4 weeks?



Temperature Is Important in Our Lives

Jimmy had never thought much about temperature until he decided to make money by selling cold drinks. He hoped for warm weather so everyone would be thirsty. Then his uncle in California wrote that a sudden drop in temperature had ruined his orange crop, which meant that he lost lots of money.

Can you think of some changes that temperature makes in our ways of living? Make a list of some changes you know (like spring to summer). As you make your list, think how knowing the temperature helped the children choose clothing for the snow trip. Here's another clue: Does temperature have anything to do with the place you choose for your vacation?

Jenny and Bob are watching the thermometer on the outside of their house. Their mother said they could go swimming if the temperature went up as high as 70°. The little mark (°) by the 70 means **degrees.** How many more degrees will the thermometer have to go up before it is 70°?

The children know that a schoolroom temperature of 70° is about right. They also know that 32° is the freezing point.

On the thermometer on this page, is there a line for every degree, or must you count 2° every time there is a line?

How many lines are there between every 10° on the thermometer in the schoolroom?

1. If the water in the pond froze last night, could the temperature reading have been above or below 32°? Why?

2. If the temperature reading in a schoolroom is 80°, how much too warm is it for good schoolwork?

More about Temperature

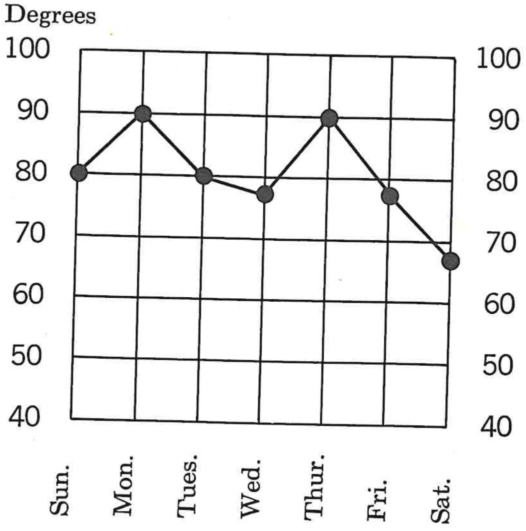
Jack's family lived in Detroit. In planning their summer vacation, they wanted to go where it is cooler than it usually is in Detroit. Jack's father got the temperature readings for places east of them and places west of them. He found that this table gives the **average** temperature for these places. This average means that there is a temperature which is about how hot or cold it is at this time of year, every year. Can you tell from these figures whether they went east or west of Detroit for their vacation?

EAST		WEST	
Philadelphia	96°	Denver	83°
New York	99°	Seattle	79°
Boston	89°	San Francisco	74°
Washington	99°	Portland	82°

1. Jack and Mary made a record of the highest temperature in their city for a week. This is the way it looked.

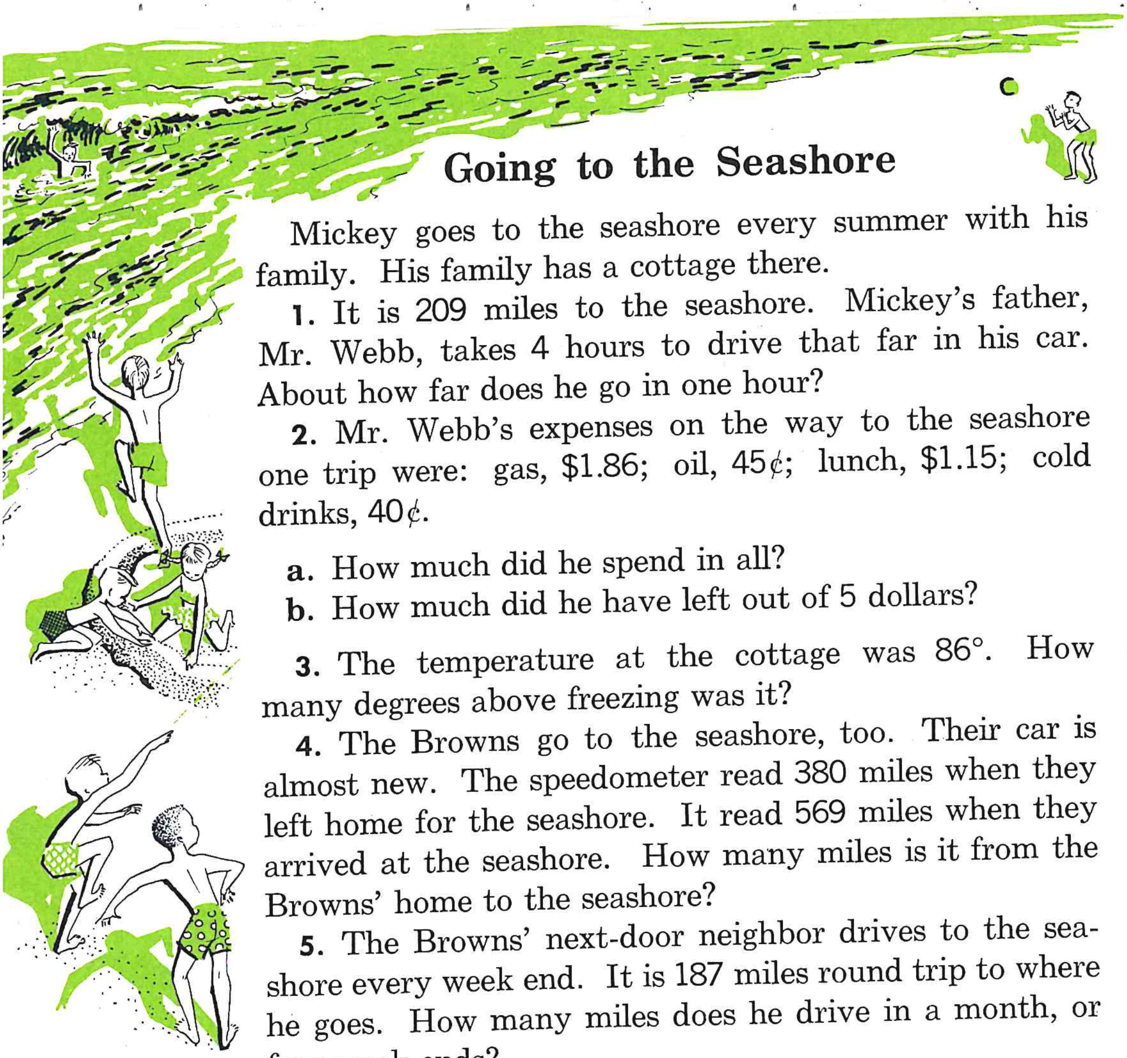
Which day was the hottest day of the week? Which 2 days had the same temperature? What was the temperature on Wednesday?

If you add the temperatures for the 7 days and then divide the answer by 7, it gives you the average temperature for the week.



2. Find the average of these winter temperatures: 8°, 12°, 26°, 14°, 30°, 0°.

Broken-Line Graph



Going to the Seashore

Mickey goes to the seashore every summer with his family. His family has a cottage there.

1. It is 209 miles to the seashore. Mickey's father, Mr. Webb, takes 4 hours to drive that far in his car. About how far does he go in one hour?

2. Mr. Webb's expenses on the way to the seashore one trip were: gas, $1.86; oil, 45¢; lunch, $1.15; cold drinks, 40¢.

a. How much did he spend in all?

b. How much did he have left out of 5 dollars?

3. The temperature at the cottage was 86°. How many degrees above freezing was it?

4. The Browns go to the seashore, too. Their car is almost new. The speedometer read 380 miles when they left home for the seashore. It read 569 miles when they arrived at the seashore. How many miles is it from the Browns' home to the seashore?

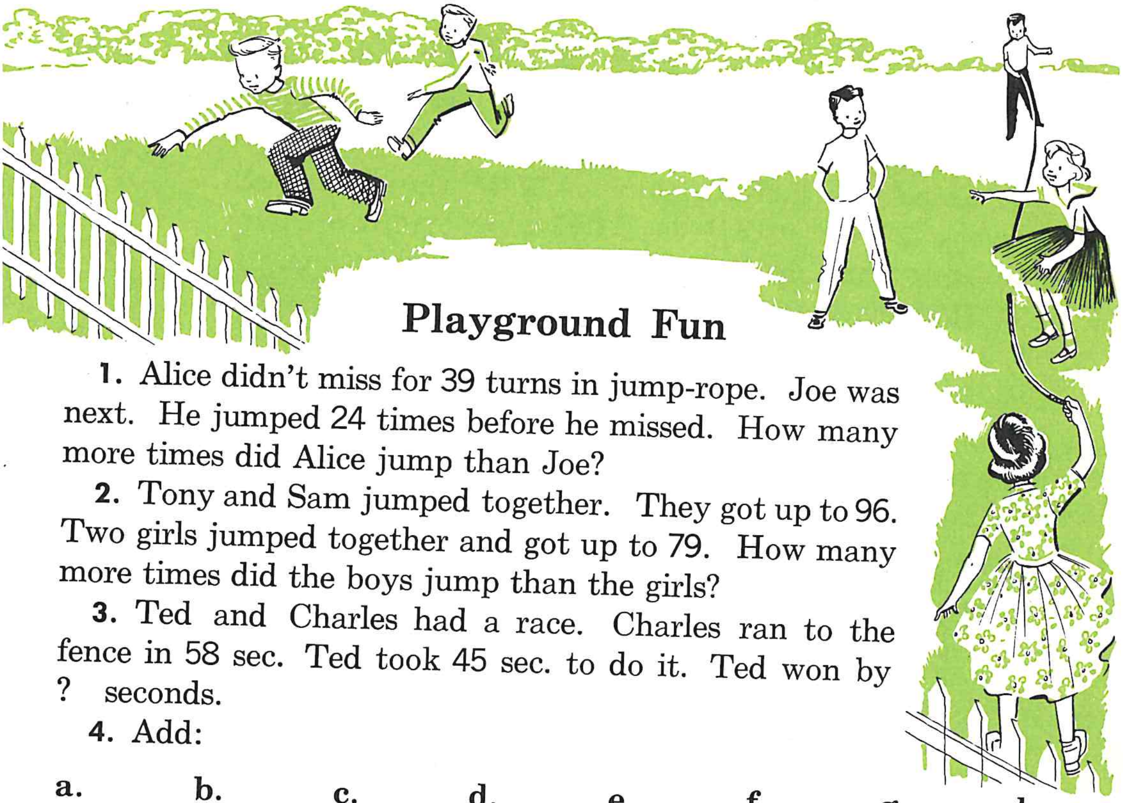
5. The Browns' next-door neighbor drives to the seashore every week end. It is 187 miles round trip to where he goes. How many miles does he drive in a month, or four week ends?

6. Add:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
135	378	239	391	488	446	550	404
367	14	303	127	190	218	157	306
165	491	139	345	176	187	257	128

7. Divide:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
$9\overline{)243}$	$5\overline{)875}$	$9\overline{)234}$	$5\overline{)890}$	$4\overline{)556}$	$3\overline{)144}$



Playground Fun

1. Alice didn't miss for 39 turns in jump-rope. Joe was next. He jumped 24 times before he missed. How many more times did Alice jump than Joe?

2. Tony and Sam jumped together. They got up to 96. Two girls jumped together and got up to 79. How many more times did the boys jump than the girls?

3. Ted and Charles had a race. Charles ran to the fence in 58 sec. Ted took 45 sec. to do it. Ted won by ? seconds.

4. Add:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**
46	24	19	16	23	67	54	76
35	18	37	47	57	17	35	19

5. Subtract:

87	38	57	60	81	93	80	76
56	20	38	27	29	67	50	40

6. Multiply:

46	28	17	24	16	14	29	18
2	3	5	3	4	6	3	5

7. Divide:

a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**
$3\overline{)48}$	$5\overline{)70}$	$6\overline{)96}$	$7\overline{)98}$	$5\overline{)85}$	$3\overline{)69}$	$3\overline{)81}$

Practice — Whole Numbers

Unit Review

1. How many inches are there in one and one-half feet? in one and one-fourth yards?

2. Could you find the number of things in $3\frac{1}{4}$ dozen by using 12 + 12 + 12 + 3? Why? How many are there?

3. How many inches shorter is $\frac{1}{4}$ yard than $\frac{1}{3}$ yard?

4. How many ounces in 2 lb. and 10 oz.? in two and one-half pounds?

5. On Play Day, Miss Allen and the children prepared 5 gallons of punch. How many children could have a pint of punch to drink? If each child can have only 1 cup, how many children can be served?

6. 1 pt. = ? cups 1 gal. = ? cups $\frac{1}{2}$ min. = ? sec.
1 qt. = ? cups 2 gal. = ? pints $\frac{1}{3}$ da. = ? hr.

7. A temperature of 32° will freeze water. Would water freeze if the temperature were 28°? Why?

8. How much colder is a temperature of 68° than one of 75°?

9. The temperature now is 68°. If it goes 19° higher at the warmest time of the day, what will be the temperature reading then?

10. If a train leaves the station at 4 min. before 9 o'clock and you arrive there at 4 min. after 9 o'clock, by how many minutes did you miss the train?

11. Add:

$$\begin{array}{r} 3\text{ ft. } 9\text{ in.} \\ \underline{4\text{ ft. } 11\text{ in.}} \end{array} \qquad \begin{array}{r} 3\text{ gal. } 3\text{ qt.} \\ \underline{5\text{ gal. } 1\text{ qt.}} \end{array}$$

12. Subtract:

$$\begin{array}{r} 6\text{ lb. } 10\text{ oz.} \\ \underline{4\text{ lb. } 14\text{ oz.}} \end{array} \qquad \begin{array}{r} 5\text{ hr. } 32\text{ min.} \\ \underline{2\text{ hr. } 48\text{ min.}} \end{array}$$

13. Multiply:

$$\begin{array}{r} 2\text{ bu. } 3\text{ pt.} \\ \underline{4} \end{array} \qquad \begin{array}{r} 3\text{ wk. } 4\text{ da.} \\ \underline{6} \end{array}$$

14. Divide:

$$4\overline{)9\text{ hr. } 36\text{ min.}}$$

Unit Test

1. Finish these:

a. ? seconds = 1 minute
b. ? days = 1 week
c. ? feet = 1 yard
d. ? weeks = 1 year
e. ? quarts = 1 gallon
f. ? inches = 1 foot
g. ? minutes = 1 hour
h. ? cups = 1 gallon
i. ? pecks = 1 bushel
j. ? quarts = 1 peck
k. ? pints = 1 quart
l. ? hours = 1 day
m. ? inches = 1 yard
n. ? ounces = 1 pound

2. $\begin{array}{r} 7 \text{ ft. and } 8 \text{ in.} \\ \underline{+\,3 \text{ ft. and } 1 \text{ in.}} \end{array} \qquad \begin{array}{r} 1 \text{ ft. and } 1 \text{ in.} \\ \underline{+\,1 \text{ ft. and } 11 \text{ in.}} \end{array} \qquad \begin{array}{r} 4 \text{ ft. and } 9 \text{ in.} \\ \underline{+\,3 \text{ ft. and } 4 \text{ in.}} \end{array}$

3. $\begin{array}{r} 4 \text{ ft. and } 8 \text{ in.} \\ \underline{-\,1 \text{ ft. and } 4 \text{ in.}} \end{array} \qquad \begin{array}{r} 5 \text{ ft. and } 1 \text{ in.} \\ \underline{-\,2 \text{ ft. and } 6 \text{ in.}} \end{array} \qquad \begin{array}{r} 8 \text{ ft. and } 4 \text{ in.} \\ \underline{-\,7 \text{ ft. and } 1 \text{ in.}} \end{array}$

4. $\begin{array}{r} 3 \text{ lb. and } 2 \text{ oz.} \\ \underline{\times 4} \end{array} \qquad \begin{array}{r} 1 \text{ ft. and } 3 \text{ in.} \\ \underline{\times 3} \end{array} \qquad \begin{array}{r} 7 \text{ ft. and } 9 \text{ in.} \\ \underline{\times 2} \end{array}$

5. $2\overline{)10 \text{ hr. and } 16 \text{ min.}} \qquad 4\overline{)4 \text{ hr. and } 8 \text{ min.}} \qquad 3\overline{)12 \text{ ft. and } 9 \text{ in.}}$

6. Mary bought 8 pints of strawberries. How many quarts did she buy?

7. Mother had enough tomatoes to can 8 quarts. She found that she had only 4 quart jars and lots of pint jars. How many pint jars did she have to use after she filled the quarts?

8. Jimmy picked up potatoes in peck measures before he put them into the bushel baskets at the end of the row. How many pecks did he pick up if he had 2 bushel baskets filled?

9. Mike won a running race in 68 seconds. How many minutes and how many seconds was he running?

10. Mike beat Tommy by 14 seconds. How long did it take Tommy to run the same distance?

UNIT 10

Getting Ready for Summer

Harry's grandparents live a long way from his home. It would take Harry 2 days and 1 night to travel there by train. His mother and father think it would be better for him to go by airplane. He would get there in a few hours.

Harry's father told him it was 1,348 miles to where his grandparents live. Do you know how to read this number? Have you ever gone this far from your home?

Patty is going on a trip in the car with her family. Her mother and father spend evenings studying road maps and figuring how much money they will need for everything. They have the first week planned already. They think it will cost $189.00. Do you know how much money this is?

Steven thinks a map is as much fun for wishing as a mail order catalogue. He just picks out a road and lets it take him somewhere. Sometimes he goes a long distance — maybe 900 miles or more. Other times he goes only 100 miles or so. He knows how far it is to Aunt Ruth's house; it is 100 miles away. Then he figures that other distances are about one-half that far, five times that far, or however far they are.

Jim's family stays at home all summer. But Jim has lots of things planned. He knows where there is the best swimming pool in the whole world, and he knows some of the boys that play at Tilden Park. He can go to the library for reading books, too.

John lives on a farm, so his family never goes away in the summer. He would miss all the farm animals if he did go, and who would take care of the animals? Besides, he knows where a big trout feeds, and he will catch him this summer!

1. Read these: $4.85, $2.05, $10.20, 278, 960, 856, 600.
2. Write five hundred twenty-eight in figures.

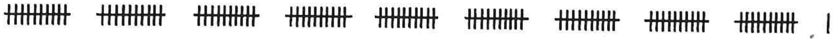
Going on a Trip

Bob and Marjorie live in Omaha, Nebraska. They are going with their mother and father to Chicago, Illinois. Bob looked on a mileage chart and found that it is 482 miles from Omaha to Chicago.

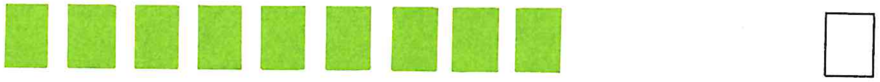
When Bob saw this number, he knew there were 4 hundreds, 8 tens, and 2 ones in it. Marjorie wanted to know how he knew it was that many miles.

Bob said, "I will show you, but I will use trading cards to stand for the miles. You see that it is hard to tell how many cards there are. I will count out 10 cards and put a rubber band around them. I could do this with all the cards which I have, until I have less than 10 cards left."

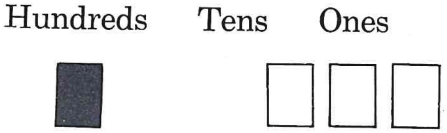
Bob made this grouping:



You see 9 groups of 10 ones and 1 one = 91. Then he put a colored card in place of each bundle of 10 ones. He called these "tens counters":



Now add 12 ones to the 91 and see what you get. Why would it give you 10 tens and 3 ones, or 10 colored cards and 3 regular ones?



If you use a black card for the 10 colored cards (10 tens), you have 1 black card for the hundred and 3 regular cards for the 3 ones.

Draw a picture of the hundreds cards, the tens cards, and the ones cards to show the number 482.

Finding Distances on a Road Map

Bob and Marjorie are finding how far it is from their home to cities farther away. It is 55 miles from Omaha to Lincoln, and from Lincoln to York it is 56 miles. How far is it from their home to York?

$$\begin{array}{r} 55 \\ +\,56 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 55 \\ +\,56 \\ \hline 111 \end{array}$$

Add the ones first. 5 + 6 = 11, or 1 ten and 1 one. Write the 1 one in the ones place, and hold the 1 ten.

Add the tens. 5 + 5 = 10, and the 1 ten you held makes 11. 11 tens = 10 tens (1 hundred) + 1 ten. Write the 1 ten in tens place and the 1 hundred in hundreds place.

Your answer is 111 miles.

1. Add:

$$\begin{array}{rrrrr} 486 \text{ mi.} & 671 \text{ mi.} & 750 \text{ mi.} & 438 \text{ mi.} & 427 \text{ mi.} \\ 321 \text{ mi.} & 129 \text{ mi.} & 198 \text{ mi.} & 367 \text{ mi.} & 367 \text{ mi.} \\ \hline \end{array}$$

2. Bob's family and many of his aunts and uncles are going to a family picnic. One uncle drove 137 miles to get to the picnic. Bob and his family drove 43 miles to get there. How much farther did the uncle drive?

$$\begin{array}{r} 137 \\ -\,43 \\ \hline \end{array}$$

1 hundred	3 tens	7 ones
	4 tens	3 ones

$$\begin{array}{r} 137 \\ -\,43 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 137 \\ -\,43 \\ \hline 94 \end{array}$$

Subtract the ones first. 3 from 7 = 4. Write 4 in ones place in the answer.

Subtract the tens. You cannot take 4 tens from 3 tens, so you must use 1 hundred as tens. How many tens in 1 hundred? 10 tens and the 3 tens you have in tens place in 137 gives 13 tens. Now, 4 tens from 13 tens = 9 tens. The answer is 94 miles.

3. Subtract:

$$\begin{array}{rrrr} 489 \text{ mi.} & 187 \text{ mi.} & 678 \text{ mi.} & 286 \text{ mi.} \\ -\,291 \text{ mi.} & 94 \text{ mi.} & 293 \text{ mi.} & 139 \text{ mi.} \\ \hline \end{array}$$

How Many Miles?

Suppose that you are traveling by car and must cover long distances each day. One morning you see a town on the map that is 223 mi. away. Your figuring (for the whole trip) tells you that you must cover about 3 times this distance for this day. If you were able to do this, what distance would you cover?

How would you find the answer to this question? Would you use addition or multiplication? Why? Look at the multiplication: The amount will be more than 600 miles. Why?

$$\begin{array}{r} 223 \\ 223 \\ +\,223 \\ \hline \end{array} \qquad \begin{array}{r} 223 \\ \times\,3 \\ \hline \end{array}$$

Using the names of the places:

$$\begin{array}{rr} 223 & 2\text{ hundreds} + 2\text{ tens} + 3\text{ ones} \\ \times\,3 & \times\,3 \\ \cline{1-2} & 6\text{ hundreds} + 6\text{ tens} + 9\text{ ones} \end{array}$$

Thinking the places:

$$\begin{array}{rlll} 223 & 3 \times 3\text{ ones} = & ? & \text{ones} \\ \times\,3 & 3 \times 2\text{ tens} = & ? & \text{tens} \\ \cline{1-1} 669 & 3 \times 2\text{ hundreds} = & ? & \end{array}$$

The answer is 669.

You remember about holding tens when you multiply ones and get more than 9, don't you? So in larger numbers if you multiply and get more than 9 tens, you will have 1 hundred to hold. Why?

Multiply:

$$\begin{array}{r} 243 \\ \times\,4 \\ \hline 972 \end{array}$$

Multiply the ones. 4 × 3 ones = 12 ones. What do you write in ones place in the answer and what do you hold?

Multiply the tens. Is 7 correct for tens place in the answer? Do you hold any hundreds? How were the 9 hundreds in the answer found?

1. Multiply:

$$\begin{array}{r} 200\text{ mi.} \\ \times\,4 \\ \hline \end{array} \quad \begin{array}{r} 164\text{ mi.} \\ \times\,3 \\ \hline \end{array} \quad \begin{array}{r} 248\text{ mi.} \\ \times\,2 \\ \hline \end{array} \quad \begin{array}{r} 166\text{ mi.} \\ \times\,6 \\ \hline \end{array} \quad \begin{array}{r} 150 \\ \times\,5 \\ \hline \end{array} \quad \begin{array}{r} 224 \\ \times\,5 \\ \hline \end{array} \quad \begin{array}{r} 309 \\ \times\,3 \\ \hline \end{array} \quad \begin{array}{r} 225 \\ \times\,4 \\ \hline \end{array}$$

Multiplying Hundreds — Holding Place Values

Hundreds in Division

Doris is going to spend 2 weeks with her aunt and uncle on their farm. She can hardly wait. It is 324 miles to the farm. It takes the train 4 hours. How fast does the train go in one hour?

$$4\overline{)324} \quad = \quad 4\overline{)3\text{ hundreds} + 2\text{ tens} + 4\text{ ones}}$$

□ □ □   ▯ ▯ ||||

Can you divide 3 hundreds into 4 equal parts and get all hundreds? You must use 32 tens. Why?

$$4\overline{)324} \quad = \quad \begin{array}{r} 8\text{ tens} + 1\text{ one} \\ 4\overline{)32\text{ tens} + 4\text{ ones}} \\ \underline{32\text{ tens}\phantom{ + 4\text{ ones}}} \\ 4\text{ ones} \\ \underline{4\text{ ones}} \end{array} \quad = \quad 81 \qquad \text{Why?}$$

Divide, thinking the hundreds, tens, and ones.

$$\begin{array}{r} 8 \\ 4\overline{)324} \\ \underline{32} \end{array}$$

32 tens divided into 4 equal parts = 8 tens in each part. You put the 8 in tens place in the answer. Why? You used all 32 tens, so put 32 under the 32 tens to show that none are left.

$$\begin{array}{r} 81 \\ 4\overline{)324} \\ \underline{32} \\ 4 \\ \underline{4} \end{array}$$

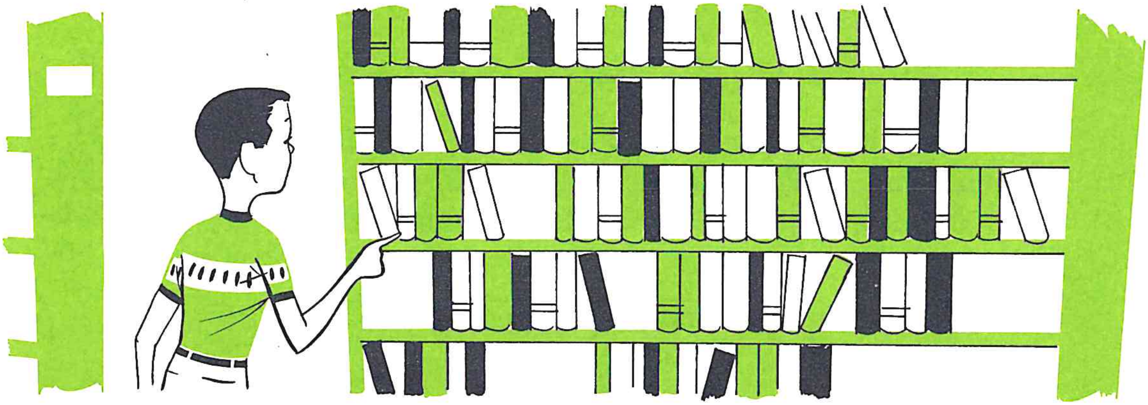
You have 4 ones left to be divided. 4 ones divided by 4 = 1 one. Write 1 in ones place in the answer. Why is the 4 written under the 4 ones? The division gives 81 for an answer. The train goes 81 miles an hour.

1. Divide, writing the hundreds, tens, and ones:

a.	**b.**	**c.**	**d.**	**e.**	**f.**
$3\overline{)279}$	$5\overline{)255}$	$6\overline{)240}$	$4\overline{)368}$	$9\overline{)459}$	$8\overline{)568}$

2. Divide, thinking the hundreds, tens, and ones:

$7\overline{)287}$ $3\overline{)249}$ $4\overline{)\$1.68}$ $6\overline{)\$1.80}$ $5\overline{)205}$ $2\overline{)188}$



At the Library

Jim goes to the library often in the summer. He sees his friends there. Sometimes he starts reading his book before he takes it home, because it looks so good.

The librarian, Miss Jones, is nice to him. She helps him find the books he wants. She always knows where the kind of books are that he likes.

Sometimes, for fun, Jim counts the books on the shelves while his friends are checking out books.

Most of the time, Jim counts by 2's or 3's, and sometimes 4 books at a time. This is faster. It does not take him long to see how many books there are on each shelf.

See if you can count 3 books at a time on each shelf. Now try very hard and see if you can do 4 at a time. Go slowly if you have to.

When Jim was looking in a book, he saw something very strange. It was this: Chapter IV.

"My goodness, look at this, Miss Jones," Jim said. "What is the matter with this book?"

Miss Jones laughed and said, "That means that it is Chapter Four, Jim."

"Four! Then why don't they write it like it should be?"

"That is one way of doing it. It is called a **Roman Numeral.**"

Roman Numerals

How to Write Roman Numerals

Miss Jones told Jim that the Romans made the 5 like a V. Then she showed him how the V was just like the V between his first finger and his thumb.

5 = V

The 4 is the finger just before the V that makes the five, so it is written IV. It means 1 less than 5, as we know in our numbers. X is 10.

4 = IV

Miss Jones wrote down the Roman numerals from 1 to 20 for Jim. First she wrote one of our numbers and then she wrote the Roman numeral beside it.

1—I
2—II
3—III
4—IV
5—V
6—VI
7—VII
8—VIII
9—IX
10—X
11—XI
12—XII
13—XIII
14—XIV
15—XV
16—XVI
17—XVII
18—XVIII
19—XIX
20—XX

Jim said, "I know the first three already, and all I have to do is add or subtract to find the rest of them. The 4 is easy, because the I is placed on the left of the V: 5 − 1 = 4.

Then 5 is easy. It is a V. Six is a V and I more, or 5 + 1 = 6. Seven is a V and II more. Eight is V and III more.

If ten is an X, then nine is I less than X, or IX. Eleven would be X and I more, or XI."

Study the Roman numerals a few minutes. Then see how many you can write.

1. Write the Roman numerals for 1, 2, and 3.

2. The 8 in Roman numerals is 5 and 3 more. Write it.

3. How do you write 10 in Roman numerals? 20?

4. Write from 1 to 11 in Roman numerals.

5. Tell which of the Roman numerals from I to XX use addition in making them.

6. Look at the number 19 as it is written in Roman numerals. How is subtraction used in the form XIX?

Unit Review

1. Jane's mother bought camping clothes for Jane and her brother. She bought 2 pairs of jeans, one for each of the 2 children. The 2 pairs cost her \$6.50. What did each pair cost? ($2\overline{)\$6.50}$ =?)

2. Mother bought 2 shirts for Bill at \$2.95 each and 2 shirts for Jane at \$2.35 each. Find the total cost.

3. Jane's father spent his three-weeks vacation and 3 week ends in addition with his family in Prescott. He made 4 round trips from Phoenix. If a round trip is 113 miles, how many miles did he drive in all?

4. Lodging for the Allen family at a motor court for Tuesday night was \$9.00. The night before it was \$1.65 less. What was their bill for Monday night?

5. The speedometer of Mr. Adams' car read 780 miles when he left home. It read 967 miles at the end of a trip. How many miles had he gone?

6. It is 474 miles to Aunt Molly's home. It takes the train 6 hours to get there. How many miles does the train go in an hour?

7. Add:

$$\begin{array}{r}134\\173\\\underline{158}\end{array}\qquad\begin{array}{r}256\\145\\\underline{83}\end{array}\qquad\begin{array}{r}\$2.78\\.19\\\underline{2.57}\end{array}\qquad\begin{array}{r}\$\ .90\\3.37\\\underline{.93}\end{array}\qquad\begin{array}{r}147\\118\\\underline{356}\end{array}$$

8. Subtract:

$$\begin{array}{r}576\\\underline{-\ 312}\end{array}\qquad\begin{array}{r}421\\\underline{-\ 407}\end{array}\qquad\begin{array}{r}\$1.48\\\underline{-\ .90}\end{array}\qquad\begin{array}{r}908\\\underline{-\ 738}\end{array}\qquad\begin{array}{r}\$4.03\\\underline{-\ 1.37}\end{array}$$

9. Multiply:

$$\begin{array}{r}\$1.04\\\underline{\times 8}\end{array}\quad\begin{array}{r}78\\\underline{\times 9}\end{array}\quad\begin{array}{r}165\\\underline{\times 5}\end{array}\quad\begin{array}{r}\$1.40\\\underline{\times 7}\end{array}\quad\begin{array}{r}78\\\underline{\times 4}\end{array}$$

10. Divide:

$$8\overline{)\$5.76}\qquad 7\overline{)\$8.65}\qquad 9\overline{)189}\qquad 7\overline{)145}$$

Unit Test

1. Joe went on a trip with his family. They drove 156 miles the first day, 375 miles the next day, and 396 miles the last day. How many miles did they drive altogether?

2. Marjorie's family drove the car 986 miles on their trip. How much is half the distance?

3. Jane's mother found some old family budgets for clothing for the family. She gave some figures to Jane for a problem in arithmetic for her schoolwork. 1953, $190; 1954, $150; 1955, $175; 1956, $200.

a. How many years are shown in the figures?

b. Which year shows the highest amount budgeted?

c. How much more was in the budget for clothing in 1956 than in 1954?

4. Mr. Brown bought lunch for his family of 6. What did all of their lunches cost at 85¢ each?

Which is easier to do, add or multiply?

Do you remember that if all the parts are equal, it is easier to multiply? If the parts are not equal, it is easier to add. Why? Find the answer by addition, then check by multiplication.

$$\begin{array}{r} 85¢ \\ 85¢ \\ 85¢ \\ 85¢ \\ 85¢ \\ +\,85¢ \\ \hline \end{array} \qquad \begin{array}{r} 85¢ \\ \times\,6 \\ \hline \end{array}$$

5. Add:

$$\begin{array}{r} 67 \\ 59 \\ 75 \\ \hline \end{array} \quad \begin{array}{r} 89 \\ 79 \\ 76 \\ \hline \end{array} \quad \begin{array}{r} \$.90 \\ .51 \\ .48 \\ \hline \end{array} \quad \begin{array}{r} 267 \\ 59 \\ 177 \\ \hline \end{array} \quad \begin{array}{r} \$1.75 \\ 1.93 \\ 2.96 \\ \hline \end{array}$$

6. Subtract:

$$\begin{array}{r} 404 \\ -\,289 \\ \hline \end{array} \quad \begin{array}{r} 617 \\ -\,176 \\ \hline \end{array} \quad \begin{array}{r} \$8.32 \\ -\,4.57 \\ \hline \end{array} \quad \begin{array}{r} \$9.40 \\ -\,5.99 \\ \hline \end{array}$$

7. Multiply:

$$\begin{array}{r} 67 \\ \times\,8 \\ \hline \end{array} \quad \begin{array}{r} 203 \\ \times\,4 \\ \hline \end{array} \quad \begin{array}{r} \$.81 \\ \times\,6 \\ \hline \end{array} \quad \begin{array}{r} \$1.76 \\ \times\,4 \\ \hline \end{array}$$

8. Divide:

$$7\overline{)35} \qquad 9\overline{)\$.86} \qquad 7\overline{)467}$$

Tables of Measure

Length Measures

12 inches (in.) = 1 foot (ft.)
3 feet = 1 yard (yd.)
36 inches = 1 yard
12in.=1foot

Dry Measures

2 pints (pt.) = 1 quart (qt.)
4 quarts = 1 gallon (gal.)
8 quarts = 1 peck (pk.)
4 pecks = 1 bushel (bu.)

Liquid Measures

2 cups (c.) = 1 pint (pt.)
2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

Weight Measures

16 ounces (oz.) = 1 pound (lb.)

Counting Measures

12 things = 1 dozen (doz.)
12 dozen = 1 gross (gr.)
20 things = 1 score

Cooking Measures

3 teaspoons (tsp.) = 1 tablespoon (tbs.)
16 tablespoons = 1 cup (c.)
2 cups = 1 pint (pt.)

Time Measures

60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours = 1 day (da.)
7 days = 1 week (wk.)
4 weeks = 1 month (mo.)
12 months = 1 year (yr.)
365 days = 1 year
52 weeks = 1 year
366 days = 1 leap year
100 years = 1 century

Money Measures

5 cents = 1 nickel
10 cents = 1 dime
25 cents = 1 quarter
50 cents = 1 half-dollar
100 cents = 1 dollar
5 nickels = 1 quarter
20 nickels = 1 dollar
10 dimes = 1 dollar
4 quarters = 1 dollar
2 half-dollars = 1 dollar

Pages 309 to 312
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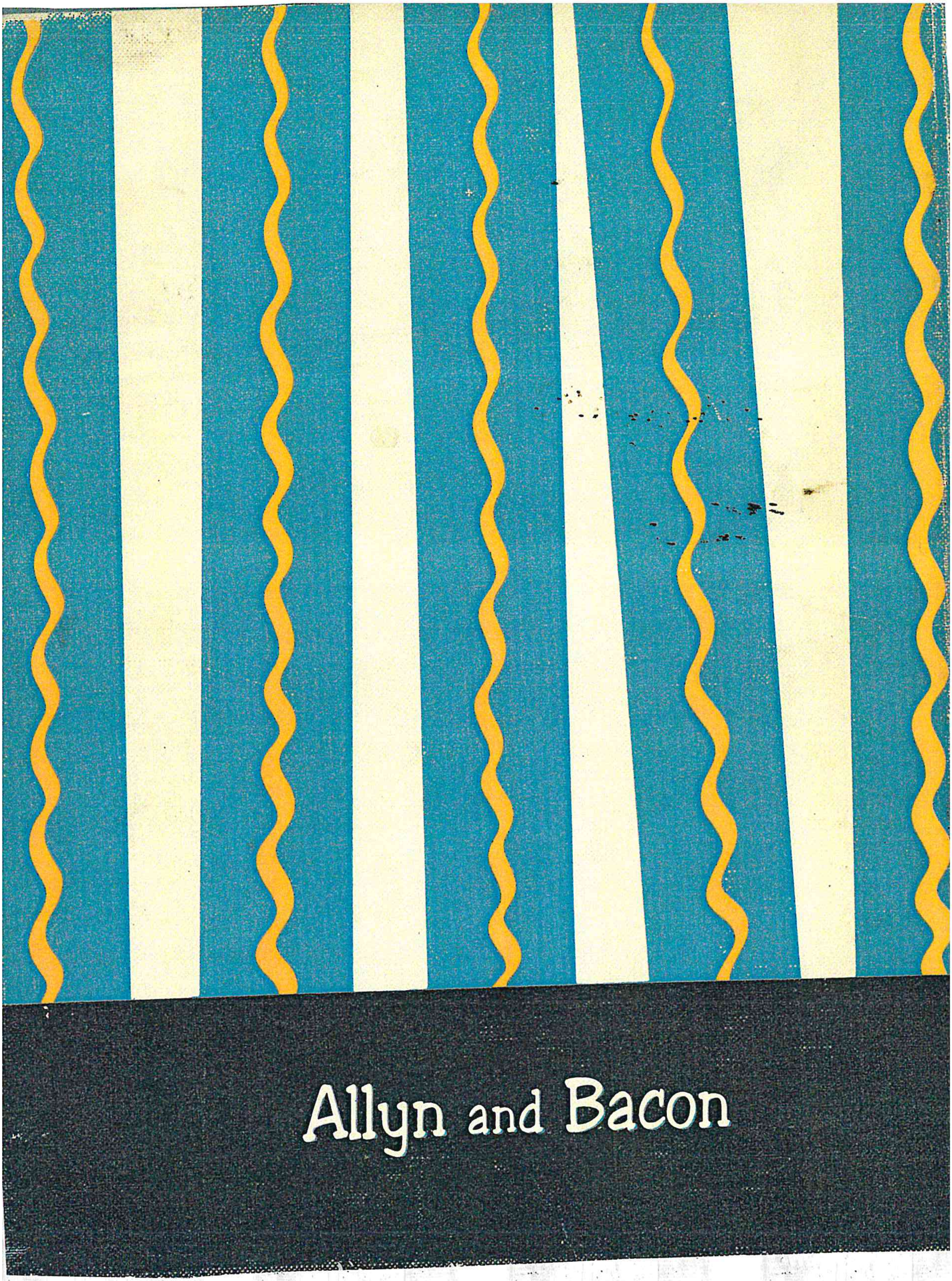

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